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Hidden Defects in Iron Castings

Method of Localizing Shrink Cavities and Blowholes
to Places Where They Can Do No Real
Harm to the Casting

BY PAUL R. RAMP*



HIDDEN defect in a casting is a defect which occurs at a point that is not machined; it is under the surface, where it is not discovered unless the casting breaks. These defects are often the cause of failures in service. They are more dangerous than defects which appear

upon the surface, or defects brought to light in machining, because the latter can often be repaired and the casting made safe and sound for the purpose for which it was intended.

For this reason we believe that, if a casting is so molded that all defects will appear on the surface, or will be discovered during machining, there will be fewer failures in service. And many valuable castings will be saved, which today find their way to the scrap pile.

A solid casting made of good metal, with defective places so located as to indicate that they represent all the defects there are, is a much safer proposition, if welded or repaired, than many apparently perfect castings which contain hidden defects, that cannot be discovered until they cause the casting to fail in service.

It is vitally important that more consideration be given to the method of molding, with a view to making a safe casting, free from hidden defects. The old plan of molding a casting—with the idea of keeping the parts to be machined clean and free from defects, and allowing the unavoidable and other defects to locate where they will not be discovered—should be discontinued.

A mold should be made in such a manner that, when poured, all the defects, if any, will be brought to the surface, or to a point where they will be discovered in machining. Then they can be repaired and a better and safer casting can be produced.

Engineers and machine shops are to some extent responsible for failures in castings in service. They often refuse to accept a large, difficult casting, because of visible defects which could be repaired. Hence, to satisfy them, the foundryman makes his mold in such a manner as to make the casting pass visual inspection. This is sometimes at the cost of strength and safety, because defects such as shrink cavities and

blowholes, which he cannot eliminate, he moves to a point where they will not be detected on inspection.

Most large, difficult castings have hidden defects, and some of them are dangerous.

When it becomes possible to have all castings X-rayed for defects, there will be a decided change in molding methods; more minor repair work will be approved by the engineers. It may be demonstrated that many apparently perfect castings contain hidden defects that are dangerous; but which, if they could be moved to a point where they could be repaired, would not affect the quality or strength of the casting. While we cannot look into a casting and see these hidden defects, we know they are there. If the foundryman knows how a casting has been poured, he also knows where there is a possibility of a hidden defect.

Locating Hidden Defects

TWO methods of molding turbine casings—shown in Figs. 1 and 2—form a good illustration of what we are trying to bring out. Fig. 1 is a partial cross-section of a mold, with the bottom of the casing cast up. This plan insures a perfectly clean flange. When this casting has been machined it would readily be accepted, by the inspecting engineers, as a desirable casting. When the flanges are cast down in this manner, all foreign matter and indications of shrink holes are absent from the face of the flange. No trouble is likely to be experienced until the casting is put under pressure. Then it is possible that leaks will be found in the bottom or body of the casting, caused by blowholes or soggy metal.

Insufficient metal pressure on the surface of the molds and cores is the cause of these defects.

On the right-hand side of Fig. 1 (and of Fig. 2) is a scale representing the pounds pressure per square inch, at various depths, that is exerted against the surface of the mold and cores, while the metal is in the liquid state. In Fig. 1 only 6 lb. per square inch of pressure is exerted against the cores and mold that form the lower portion of the body of the casing. This is not enough pressure to prevent blowholes or soggy metal at points indicated by B and C.

To produce a sound casting of this character at this point the metal pressure against the surface of the mold should be from 15 to 16 lb. per square inch. If the risers and gates on this mold, shown in Fig. 1, were built up high enough to produce the required pressure at this point, the pressure at the joint flanges would be increased to 26 lb. per square inch, which would be

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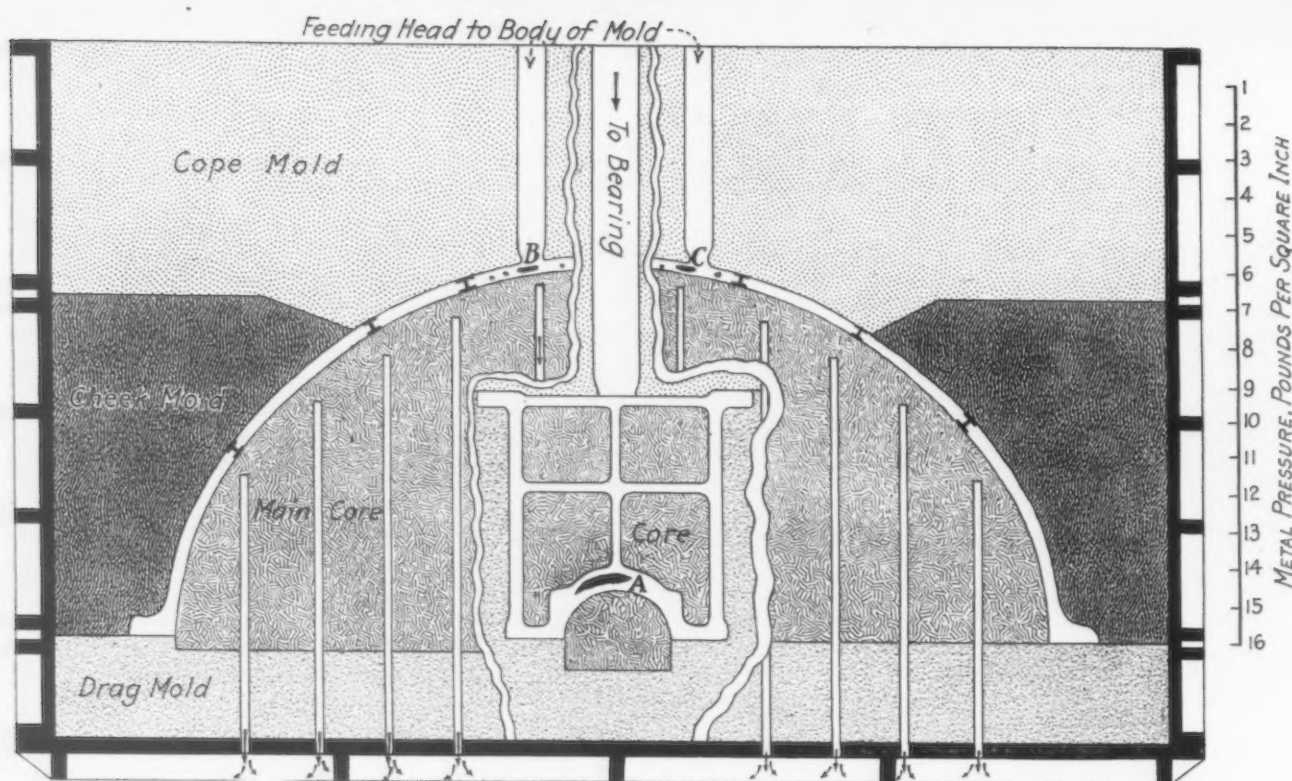


Fig. 1—Former Method of Casting Casing for Steam Turbine, with Flange Downward. Defects shown at A, B and C were caused by having insufficient metal pressure above the points indicated. Formation of defects at B and C was furthered by gases from the vents, working upward instead of downward, as intended

liable to strain the mold there and increase the thickness of the metal. Such irregularity in the thickness of the body is likely to create excessive internal strains in the casting, causing it to crack more easily under vibration.

Thus, while the plan of molding shown in Fig. 1 will produce a clean joint flange, it will produce also a very poor and unreliable metal in the bottom of the casting. When molding the casing in this manner it is impossible to provide the proper feeding heads for the heavy sections of the mold that form the bearings. The only feeding head possible is that shown in Fig. 1, which is a riser located directly over the bearing. But its only connection with the bearing section of the mold is through the thinner section of the housing. As a consequence, long before the bearing proper has solidified, the thinner section of the housing has become solid and shut off the supply of feeding metal from the risers to the bearing. The result is a hidden defect shown at A, which materially weakens the bearing. This defect is far more dangerous than a similar defect would be on the machined side of the bearing, where it could be detected and repaired.

Dense and Strong Metal Occurs Naturally at Lowest Point

It is well known that the metal in the lower part of the mold is denser, stronger and more free from blowholes and soggy places than the metal near the top of the mold. This is the result of the greater pressure exerted at the bottom while the metal is in the liquid state. This pressure is great enough in the lower parts to resist or counteract any action from generated gases to produce soggy metal. Consequently, sufficient pressure on the surface of the mold or cores is the best remedy for hidden defects.

This plan sometimes produces defects on the machined joints, as in case of the turbine casing, but these can be repaired readily. There should be no hesitancy on the part of engineers to accept such castings, when they realize that the method of molding has brought all defects to the surface, and at the same time has produced a sound, perfect casting at points where

hidden defects have always existed, never to be discovered until the casting is put under pressure or fails in service.

Where the Gases Go

WHEN a turbine casing of this character is cast bottom up, as in Fig. 1, all of the gas generated in the cores must be forced down through the bottom of the mold. These vent passages are shown in Fig. 1. As the pressure of the metal against the cores is not great enough in this case, the casting is liable to have internal blowholes or soggy places at B and C. This follows, because, instead of the gas traveling down

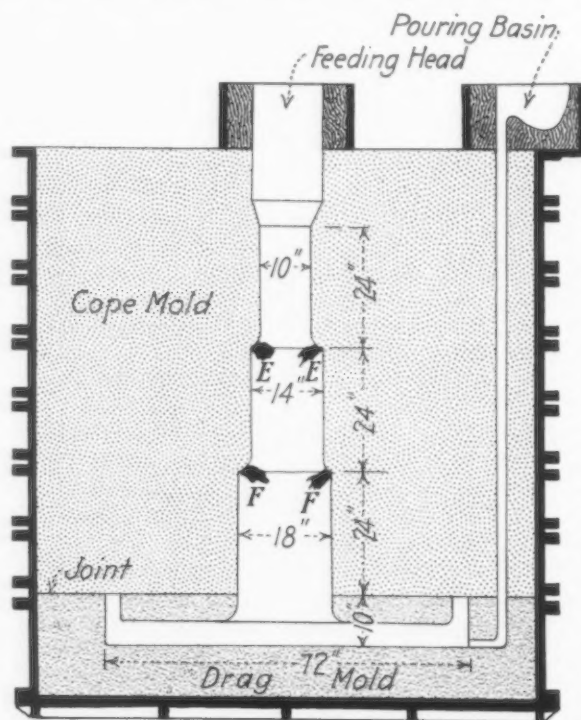


Fig. 3—Method Previously Used in Molding Shaft and Face Plate. This gave an excellent face to the plate, but defects at EE and FF produced a condition damaging to the strength of the shaft

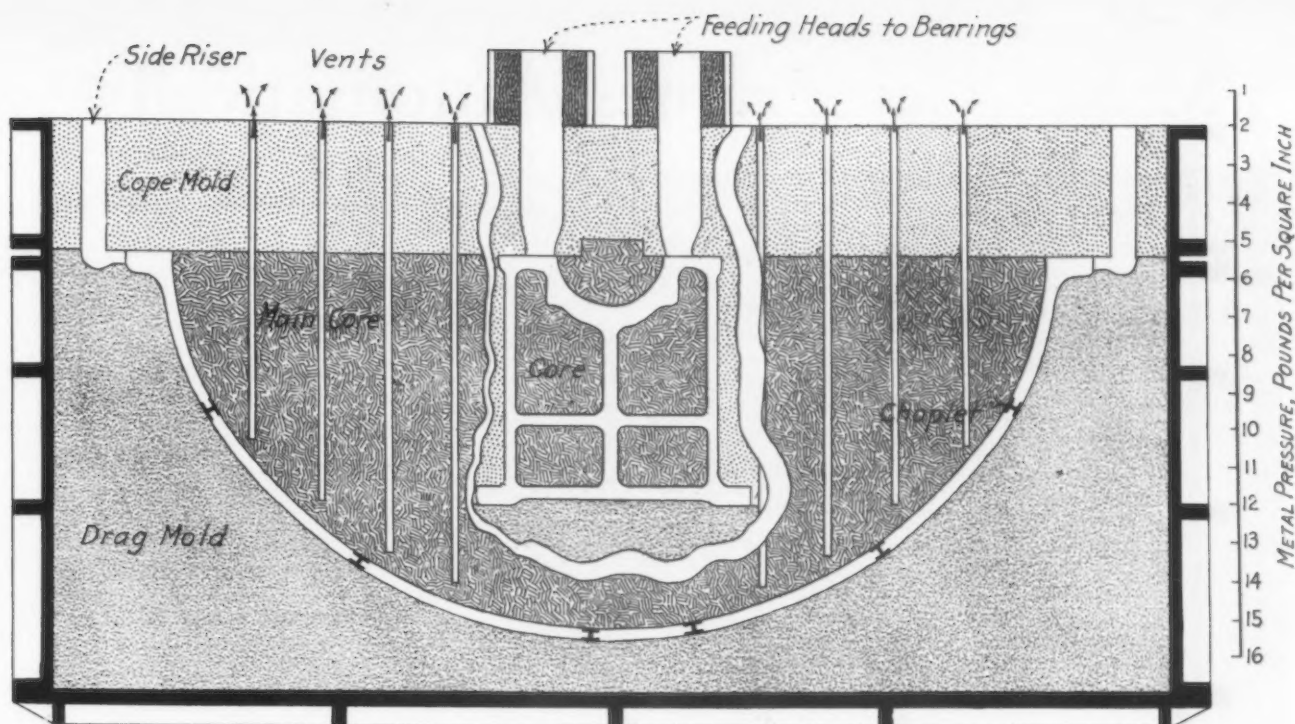


Fig. 2—Correct Method of Molding the Turbine Casing. With the flange placed upward, the defects forming, from whatever cause, will segregate themselves there. Extra thickness, to permit planing them off, may be allowed and welding will readily repair any holes remaining at that point

through the vent passages prepared for it, it will work its way through the metal against the insufficient metal pressure until the metal solidifies. This action produces blowholes, soggy metal and other hidden defects, which are the most difficult kinds of defects to repair.

A turbine casing cast as shown in Fig. 1 is liable to develop cold shuts. These are the most dangerous kind of defects, and can often be classed as hidden defects.

In producing iron castings of this character, it is important to remember that the height of the riser is of value only while the metal in the thinner sections is in the liquid state, except where the riser can be directly connected with a heavy section. It should

then be kept open with a churning rod and additional hot metal added.

Avoiding Hidden Defects

WHEN a turbine casing is cast with the bottom down, as in Fig. 2, the gas generated in the cores takes its natural course upward through the vent passages prepared for it. In addition to this advantage, there is a pressure of liquid metal of 15 or 16 lb. per square inch exerted against the surface of the cores and molds at the lower point, instead of 6 lb. pressure per square inch, as when the bottom is cast up.

It is also possible to feed directly the heavy sections of the mold, such as bearings. This should entirely eliminate the danger of a hidden defect, such as shown in Fig. 1 at A. With the feeding head connected directly to the heavy section of the mold, it is possible by keeping the feeding head in a liquid state, by churning, to maintain an open channel from the head to the heavy section. This makes it possible to add new metal as the metal in the heavy section cools, and settles away from the upper surface of the mold. This insures a solid and safe bearing, as in any other heavy section where a feeding head can be used.

Often cavities are produced directly under the feeding heads, because the molder has neglected to keep this channel open long enough to add all the new metal required by the heavy section to make it absolutely solid. But a defect directly under the feeding head is never a hidden defect, and it can be safely repaired.

With proper care in preparing the molds, in providing adequate vent passages for carrying off the gas, and properly drying the molds and cores, defects on the flanges of turbine casings can be avoided, even though the flanges are cast up. This is done by the use of side risers, or feeding heads, providing the metal is of the right temperature. There is always less danger from a defect on a flange, cast up, than of a hidden defect and a leak in the body of the casing, with the joint flange cast down. And the defects in the joint flange can be safely repaired; but the defect in the body can seldom be safely repaired, except in case of a loose chaplet, which can be plugged.

In molding and casting large desilverizing kettles

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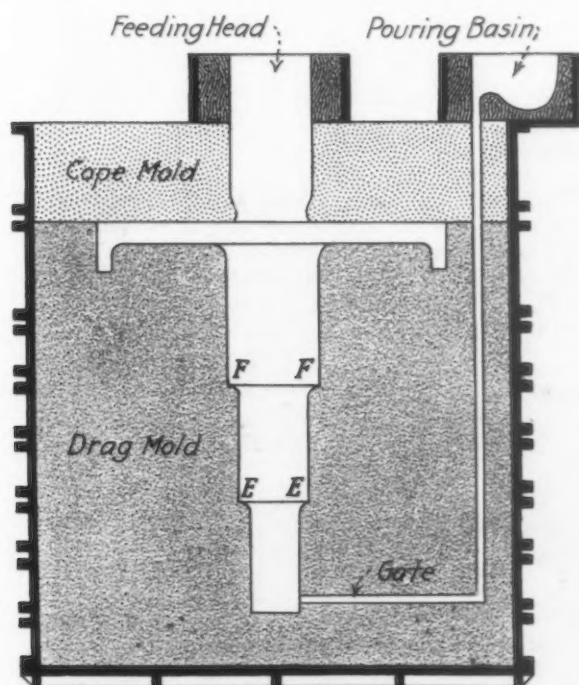


Fig. 4—Better Method of Molding the Shaft and Face Plate. Strength of the shaft is maintained, while extra metal put on the face to accommodate a poor top is planed off to a smooth surface

Makes Car Frames Automatically



*A. O. Smith Corporation,
at Milwaukee, With What
Is Virtually One Gigantic
Machine Occupying an
Entire Large Building,
Can Turn Out Per Day
7000 Wholly Assembled
Automobile Frames*

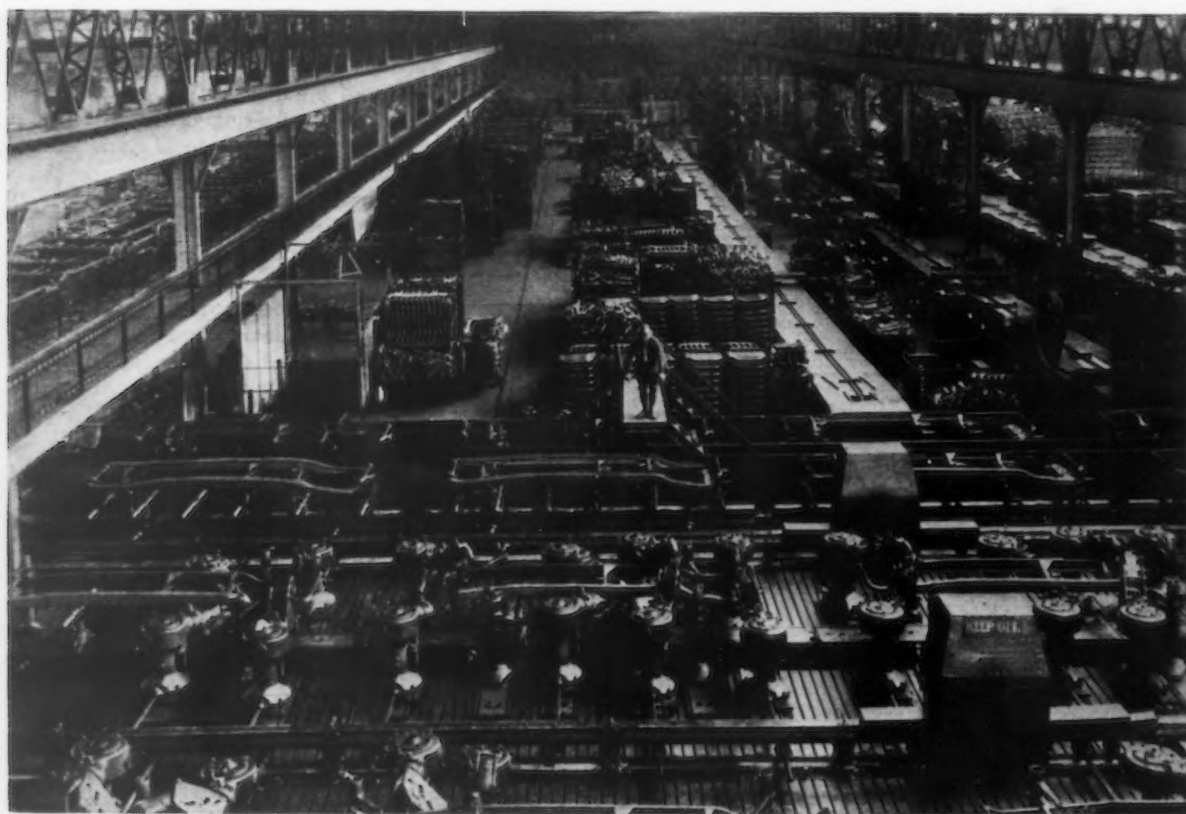
APPLICATIONS of special machinery, both for heavy and light parts manufacture, and production control were the keynotes struck at a machine shop practice meeting of the Chicago section of the American Society of Mechanical Engineers, held at the Morrison Hotel, Chicago, March 14.

The history of the pressed steel automobile frame in this country dates back to 1903, said John P. Kelley, sales manager A. O. Smith Corporation, Milwaukee, who, in a paper entitled "Production of Pressed Steel Frames by Automatic Machinery," outlined methods employed in the frame plant operated by his company.

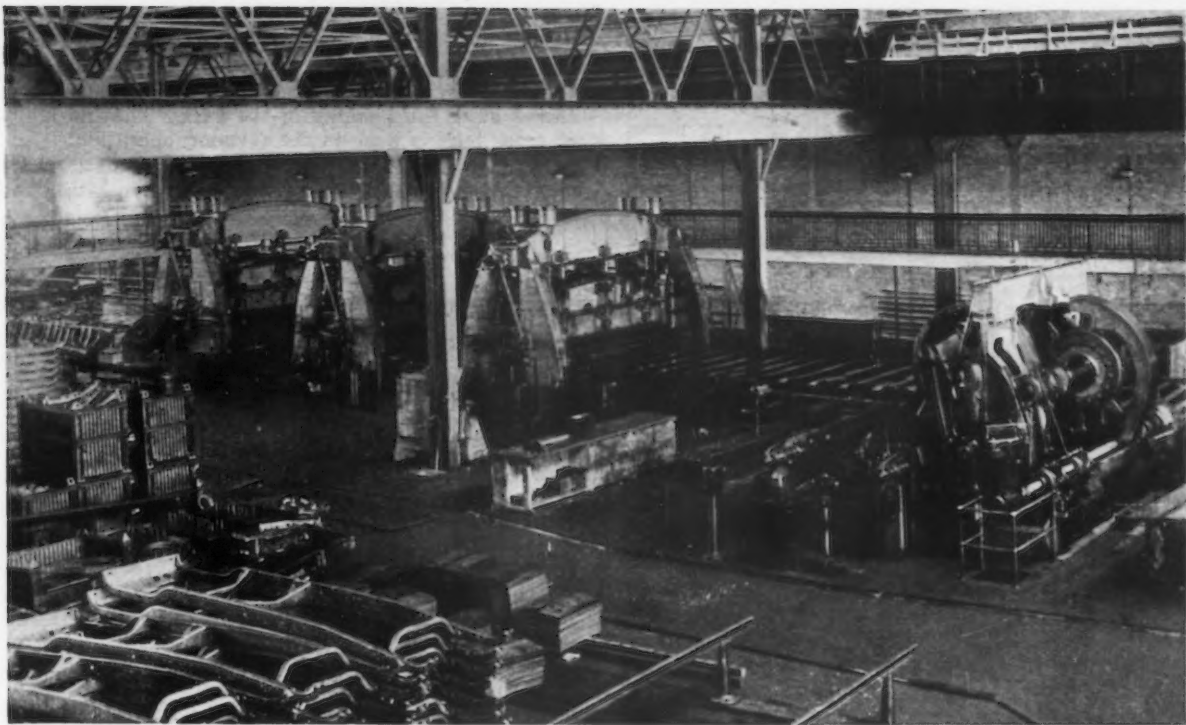
Counting 7000 frames as maximum daily production and 552 operations on each frame, the automatic ma-

chinery performs nearly 4,000,000 operations in a single day. The number of men employed to supervise this equipment is about 200, or less than one-fifth of the number that would be needed for equal production in a semi-automatic plant, one of which is also operated by the A. O. Smith Corporation. This machinery is tooled for individual orders calling for as many as 75,000 frames a year and has handled single runs of 10,000 frames. As many as 100,000 frames have been manufactured at a single set-up. A complete change of tools is accomplished in 6 to 8 hr.

The first unit in the manufacturing line is the automatic inspection machine. All side bars and most cross bars are made from strip steel, and the automatic inspec-



IN Parallel Lines the Left Side Bars, the Right Side Bars and the Different Cross Bars Come Forward from the Far End of the Building, Receiving Automatically on the Way Various Machining and Other Operations. In the foreground is the part of the machine to which these sub-assemblies of bars are delivered, progress now being transversely across the building. The parts are clamped together and fastened by rivets fed through compressed air tubes to the riveting guns



THERE ARE Six Presses at the Starting End of the Side Bar Manufacturing Line. Besides the piercing, blanking and forming of the strip steel used, they give the offsets (in the plane of the strip) to provide for the "Kick off" over the rear axle and the front and rear end drops

tion machine rolls this steel to remove curvature, measures and stacks it in loads of predetermined sizes. The strips are measured for length, width, thickness and curvature, and all rejections are automatically thrown out into separate piles. The machine has a capacity of 900 strips per hour.

From the inspection machine the steel is conveyed by monorail crane to the pickling department. Loaded crates are carried through acid tanks, rinse tanks, alkali and oil, the last to give a sufficient protective coating of oil for the subsequent fabricating operations. The crew of this department consists of seven men in each shift, and the pickling capacity is 500 to 600 tons in 24 hrs.

Pickled steel for side bars is carried by monorail

crane to the feeder for Unit No. 3, where the strips are automatically conveyed to the side bar manufacturing line. There are six presses in this line, all driven by a single 500-hp. motor, with the following order of operations:

1. Vertical offsetting of blanks for kick-up over rear axle; also for front and rear end drops.
2. Piercing left-hand bars.
3. Piercing right-hand bars.
4. Blanking left and right-hand bars.
5. Forming left-hand bars.
6. Forming right-hand bars.

The capacity of this line is 900 bars per hour.

The pickled steel for cross bars is conveyed by mono-



HERE ARE Shown the Parallel Ways for the Right and Left Hand Side Bar Assemblies, Which Are Completed at the Far End. There are 19 stations at each of which there are special machines for various operations. The progressive shift from station to station of all this mass of metal is controlled by apparatus which spots every part to the precise position opposite the working tools

rail cranes to Unit No. 4, which is the cross bar manufacturing and parts assembly line. There are four lines in this unit, each driven by a single motor of 100 hp. Each line consists of a blanking press, drawing press, automatic drilling machines and small power riveting presses—the latter for the completion of cross bar sub-assemblies, if required.

All holes that can be conveniently and correctly

placed in the bars are pierced automatically in the blanking operation. The holes subject to distortion in the drawing operations are drilled with automatic machines after the forming of the bars. The end-lapping of cross bars is done in the forming operation.

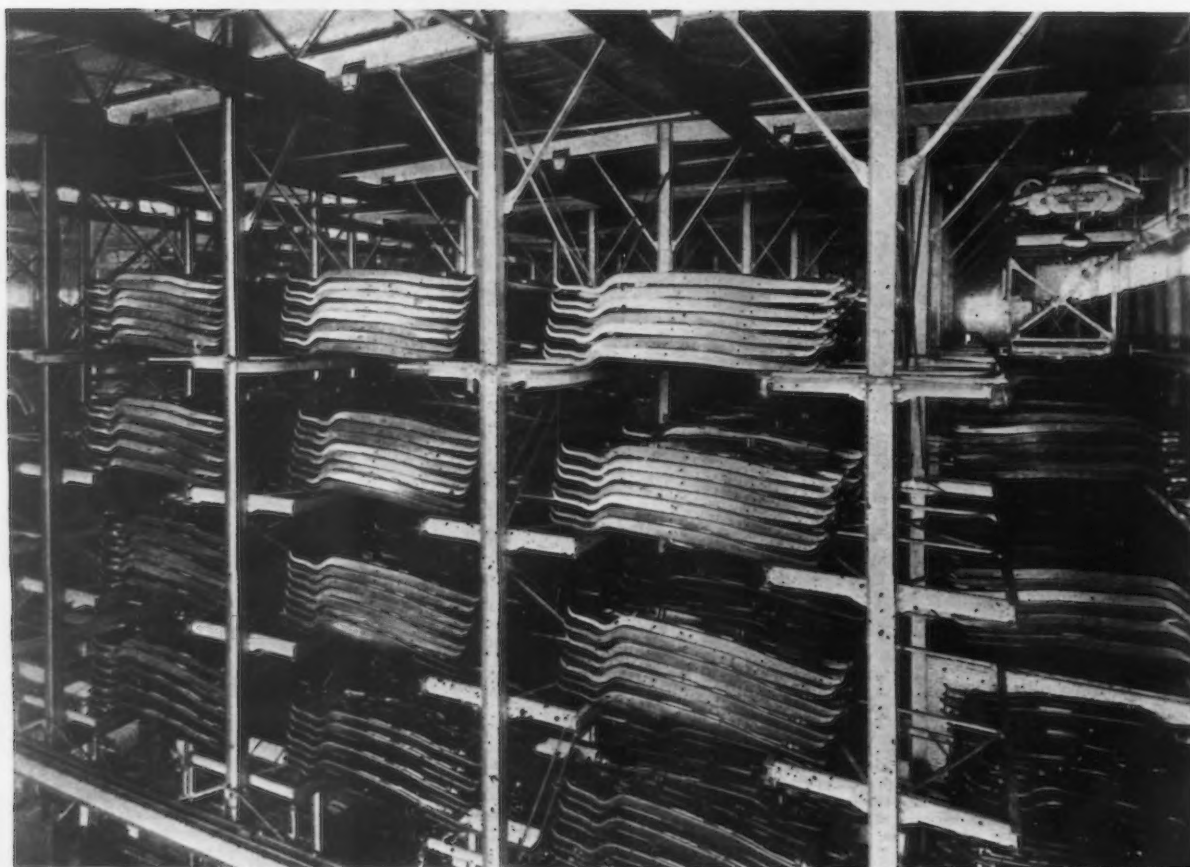
Steel is fed to the four lines by automatic feeders and carried between the presses on reciprocating feed-

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DISTRIBUTED Alongside the Sub-Assembly Section, (as indicated in the view on the bottom of page 795), Are a Number of Special Machines. One of them here shown is for finishing the spring hangers, which are attached at the proper station to the bars in process of assembly



BELOW Is a View of the Upper Part of a Lofty Storage Building, Which Communicates with a High Production Continuous Painting Machine. At the upper right may be seen the traveling monorail crane, which can be run over any aisle of the storage space, depositing groups of frames on the extending brackets



More Thinking Needed at the Top

Manufacturer Finds Danger in Delegating Too Much Authority — Courage Required to Make Necessary Changes in Policy

BY SAUNDERS NORVELL*

ONE night last week I had a most interesting talk with a manufacturer. He told me that he had always been successful in conducting a profitable business until the slump of 1921. That memorable year, in common with the rest of us, he was caught all spread out. He said that he did not get the worst of it until 1922, and then his concern almost went on the rocks. However, he secured financial assistance, sweetened up his loans at the banks and managed to pull through. Today his business, for its size, is one of the most profitable in the country.

As this manufacturer sat and smoked his cigar in an easy chair at the club, he smiled and remarked that no man's business education is complete unless he has been through such an experience—that getting a business on the rocks and then getting it off is one of the best commercial courses that any business man can receive.

"Now," said I, "tell me just what happened in your business. Give me some of the high spots." He smiled and replied: "First of all, we had a very high-priced sales manager. He was a good man and he was loyal to the concern, but he was just full of a lot of theories, and he never seemed to be able to get the idea into his head that finances had anything to do with the business. When we got into the 'hole,' he never took our condition seriously. When I told him about our financial situation, he always seemed to think that I could raise the money in some miraculous manner. He seemed to think that my talk to him about the real condition of our business was just for the purpose of heading him off from asking for a raise.

Sales Department Reorganized with Eye to Profits

"Now, of course," said this manufacturer, "this sales manager was an optimist. Every good sales manager should be an optimist. Then again, notwithstanding the fact that our concern was losing a great deal of money, he was getting his salary—and it was a large one—without any interruption whatever. Naturally, it is rather difficult for a man who has no stake in the business, and who is drawing a good salary, to fully sympathize with the management of a business when the losses are very heavy.

"Finally, after talking and talking to this sales manager, in an effort to get him to cut the suit in our selling expense according to our cloth, and after finding it was simply impossible to secure his cooperation, I decided to let him go, save his salary and take charge of the sales myself. When I announced this to my partners, they were very much opposed to it. They called my attention to the fact that this sales manager knew all the details of our business. He knew all of our business. He knew all of our salesmen. He knew all of our customers. To let him out at a critical time like this was almost suicide. 'All right,' I replied. 'If we are so dependent upon our sales manager, I am more than ever convinced that I should let him go and learn to be the sales manager myself.'

"I did let him go. I did take up the work of being sales manager. I did work about 12 hr. per day myself. At the end of six months, I knew our selling organization thoroughly. Somehow instructions going to salesmen direct from the president of the organization seemed to carry more weight. Somehow letters to customers on selling matters, signed by the president,

seemed to carry more weight. Somehow, when I was in selling conferences with customers and with salesmen, we seemed to get better and quicker action than through the sales manager. As a matter of fact, by getting into the details personally, I was able to reduce the number of our salesmen, to cut down expenses, to advance the price of our product where we were selling entirely too low and, strangest of all, to increase the volume of our sales. Now, of course, I had known the business thoroughly in years past. I had grown up in it, but in later years I had become 'rusty.' Nevertheless, it did not take me long, when I got back into the game, to pick up the threads and to see a hole in the grindstone when the hole was there!"

Conservative Factory Superintendent Blocked Changes

Then he continued: "Having got our sales department reorganized and straightened out, I decided to devote practically all of my time for a few months to production. Our factory superintendent was one of the old school type. He constantly talked about old times. He was wedded to old methods. He had never left our factory for a single week for years. When I talked to him about new methods that were being adopted to reduce costs in modern factories, he shook his head and talked in a derogatory manner about these 'efficiency experts.'

"When I put in a large part of my time at the factory, even though I have never claimed to be a factory expert, common sense indicated that many improvements and changes could be made that would lead to economy. In many directions there was duplication of work. Many things were being done which, while interesting, were not profitable. We were in a condition where it was necessary for us to cut things down to hard pan.

"Again, just as in the case of the sales manager, I found strong opposition to these changes that would save money, on the part of our factory superintendent. He talked about the loyalty of our employees, about the splendid organization we had, about what a 'fine lot of men they were, etc. As a matter of fact, he had a fatherly feeling toward the whole organization. The workmen were his children. Even if some of them were pretty poor, he sympathized with them. When it came to a question of replacing them with others of more ability, he could not part with them for sentimental reasons. Yes," said my friend, "personal acquaintance in a business is a fine thing. Personality is an excellent thing. The human touch is great. However, all these things can be overdone when they lead to losses and inefficiency and when the business itself is going on the rocks because profits are too small and costs and expenses are too high.

Engineer Hired to Introduce New Methods

"I thought the matter out very slowly and carefully, and in the end I hired a man who knew nothing whatever about our business. He was, however, a trained engineer. He had worked in several modern plants. He had an analytical mind. He was not the type of man who thought the main object in life for a factory superintendent was to be popular with his employees. We let out our old superintendent, and then I worked with this new man in reorganizing our factory.

"Of course, at first there were attempts to block

*President Remington Arms Co., Inc., New York.

these changes. There were murmurings. There were threats on the part of a number of employees that they would quit. But somehow they did not quit, and after a while the foremen began to see that the new factory superintendent knew his business. When he put in changes, he would call his foremen together and ask what objections they had to the changes. If they could bring up sound objections, he would sometimes modify his plans, but usually, by the time the suggestions were made to the foremen, they were so well worked out that the new factory superintendent could answer every question and explain the advantage of every move.

"To make a long story short, at the end of six months this new superintendent had the respect, if not the affection, of all the foremen and workers in our factory. They saw clearly that he was not working for personal popularity. That did not seem to cut any figure with him. However, he was working to handle our factory in a manner that would lead to reduced costs and greater efficiency. At the end of the year this new factory superintendent was able to show us reduced costs in almost every department.

"Another thing that appealed to me in his work was the fact that he worked with records. He put everything on paper. It was not a case of carrying things in his head. He divided the work and the responsibility, so that, when it was necessary for him to leave from time to time, everything was not held up for his return. He organized things so that the factory apparently ran just as well without him as with him.

Success of Large Companies Due to Emphasis on Getting Results

"Too many manufacturers," said my friend, "are afraid to take hold of the business themselves. They are afraid of the amount of work that is involved. One trouble today with a good many manufacturers in the United States who are not making any profits is the fact that the owners—the head men—have delegated practically all of the authority, along with all of the work, to sales managers and factory superintendents. Now, these men are usually on fixed salaries. They get their salaries whether the business makes any money or not, and with this condition they are naturally not so keen to study improvements, economies and possibilities of making profit as direct owners who manage a business and who, by reason of their stock holdings, share largely in the profits or, on the other hand, suffer severely when there are losses."

"But," I inquired of this manufacturer, "how does it happen that so many large corporations in this country are doing very well indeed and are taking the business away from the smaller corporations, when these large corporations are managed almost entirely by salaried officials?"

"Well," said this manufacturer, "in almost all such cases you will find not only that these managers have arrangements by which they share in the profits of the business, but that there are comptrollers, auditors and accountants who are carefully checking the results of every department. One of the advantages of a large corporation is the fact that the personal element actually cuts so little figure that it is a question, not of personal popularity, but of results. The men at the top in these large corporations hardly know the men at the bottom, but they do receive regular reports giving the progress in all parts of the business. The executive committees of these organizations are influenced, not by the charming manners or pleasant ways of some department manager, but only by the results in his department. Just as soon as satisfactory results are not obtained in an organization, you can count on a change following very quickly. These great corporations as a rule are not expecting men who do unsatisfactory work to reform. They haven't time to bother with reformation. They work on the basis that there are plenty of good men to be found for the jobs if they will take the time and trouble to look for the good men."

Lack of Thinking at Top Main Weakness of Business

"What were the weaknesses you discovered in your business," I inquired, "when you took hold personally?"

"One of the main weaknesses," he replied, "was lack of thinking at the top of the business. By that I mean that the men I had running the business were too much immersed in details. They were cleaning up their desks every day. They were too much inclined to do a clerk's work.

"For instance, when I asked our sales manager to tell me the three most important things we should do in our business in the next year, he had to stop and think a long time before he could offer any suggestions. Now, don't you think that any first-class, thinking sales manager would know the three most important things that were needed to make the business prosperous? Then, when he did make suggestions, they were of a detailed nature. The same thing was true of our old factory superintendent. When I asked him to tell me the three most important things we should do in our business in the next year, he also immediately went into comparatively small details.

"Now, when I took hold of the business myself, in a very short time it became apparent to me that three things could be done that would help the business very much. Two of these things were in the direction of increasing our profits. The other important thing was in the direction of economies. I immediately went to work to do these three things and I finally put them over, but in concentrating my effort on these three things, there were, of course, a lot of little things that I neglected. I was working 12 hr. per day. I could not do everything. I could not see to everything. However, I just made up my mind that I would concentrate my efforts in certain directions, and the result in the end proved that this policy was wise."

Competition That Proved Mythical

One of the things that this manufacturer soon discovered when he went into the details about his business was that a very large part of his product was being sold at its figured cost. He was assured that competition made this absolutely necessary—to advance the price was out of the question. This manufacturer very carefully went into the entire situation. He decided that on this important line of goods he must do two things, viz., he must reduce the cost of production and he must get a slight advance in price. He accomplished both results. It was freely predicted that when the price was advanced there would be a large drop in sales.

As a matter of fact, while in the beginning there was some slight resistance to the advanced price on the part of buyers, at the end of the year he found that he had sold more of this line at the advanced price than ever before. In other words, the competition which seemed so serious to his sales manager was largely mythical.

The goods of this house had been well made for years. They had an established reputation. The trade was in the habit of buying them. Therefore, when the small advance came along, which amounted to next to nothing to the jobber, to the retailer and to the consumer, it was easily absorbed, while to the manufacturer this advance, coupled with a reduction in the cost of the goods, was a life-saver.

World's Largest Stainless Iron Chain

LONDON, ENGLAND, March 10.—Special Sheffield steel has already been employed in the work which is being carried on for the strengthening of St. Paul's Cathedral in this city, and two further interesting applications of this material have been decided upon.

One of them consists of a stainless iron chain which is to be embedded in concrete inside the dome in order to strengthen it and preserve its shape. This chain, which is being made at Brown Bayley's Steelworks, Sheffield, will be 450 ft. long, each link having a length of 15 ft. 4 in. and a width of 3½ in. The links are laid in four parallel lines. The chain will weigh 33.5 tons. It will be the largest chain ever made of stainless iron.

The second application consists of the use of large tie bars of stainless iron, which have previously been used in the repairs to the cathedral, for bracing the masonry together.

10-Stand Continuous Sheet Bar Mill

Straight-Line Layout Has Also Three Edgers—
All Driven by Seven Electric Motors,
Two Being Askew

BY ROGERS A. FISKE*

WHEN the Youngstown Sheet & Tube Co. first reached a decision to build a 21-in. continuous sheet bar and skelp mill at its Indiana Harbor, Ind., plant, thought was given to the necessity of installing additional power plant equipment to furnish part of the electrical energy required by the new unit. Through an ingenious method of electrical hookup, however, it has been possible to increase the power factor of the entire system by more than 20 points, so that the power factor is now close to unity. The greater effectiveness of power equipment thus derived has made unnecessary any expansion in the number of generating units in the power plant.

Prior to the installation of the 21-in. continuous mill there was in operation a 28-in. two-high reversing mill which stood in line with the blooming mill. The 28-in. mill was housed in a building 58 ft. wide. Billets rolled on that mill were transferred to the skelp mill furnace by rope-operated cars that traveled on a track. This 28-in. unit still serves the skelp mill, but billets are now delivered from the run-out table to the heating furnace by a direct conveyor line. This method has practically made obsolete the cooling table which formerly served this mill.

That the blooming mill might adequately meet the requirements of the new continuous mill, it was decided to place the latter parallel with the 28-in. mill and adjacent to it. Therefore the old building was widened to 85 ft., so that it now houses both the 28-in. and the 21-in. mills.

Formerly the bloomer rolled plate slabs and also blooms for the 28-in. mill. It now furnishes blooms and slabs for the 21-in. continuous mill, also. This arrangement called for special equipment to be installed between the blooming mill and the two bar mills. At the end of the run-out table from the blooming mill there has been built a slab transfer table, a 1000-ton up-cut, motor-driven shear; a run-out table; scales; a kick-off and slab pilers. The shear was furnished by the Mesta Machine Co., Pittsburgh, and the transfer and tables were built by the Mackintosh-Hemphill Co., Pittsburgh. All of this equipment was placed to one side of the old shear that was ahead of the 28-in. mill. Immediately beyond the old shear a transfer table was built by means of which blooms are delivered to the new 21-in. continuous mill.

The 28-in. mill was left undisturbed except for the installation of Mesta Machine Co. electric manipulators. At a later date electric screw-down mechanisms may be substituted for the present hydraulic devices. This mill now rolls steel into sections varying from 1½-in. squares up to 2-in. x 9½-in. billets.

The Morgan Construction Co., Worcester, Mass, furnished the complete mechanical equipment for the 21-in. continuous mill, and the General Electric Co., Schenectady, N. Y., built the motors, converters and the electrical control system. Sections rolled include 6¼-in. to 16¼-in. skelp and standard sheet bars in all thicknesses. The feed table to this mill is equipped with roller bearings on the off-drive side. Bronze bushings are used on the drive side. All the drive gears have



Between the Roughing and Intermediate Sections Is an 18-In. Vertical Edger Which Is Driven by a 200-Hp. Separate Motor

cut teeth and are run in an oil bath. Ahead of the No. 1 roll stand is an up-and-down-cut shear which is used for cropping ends or for the emergency of cobbles in the mill.

Make-Up of the New Mill

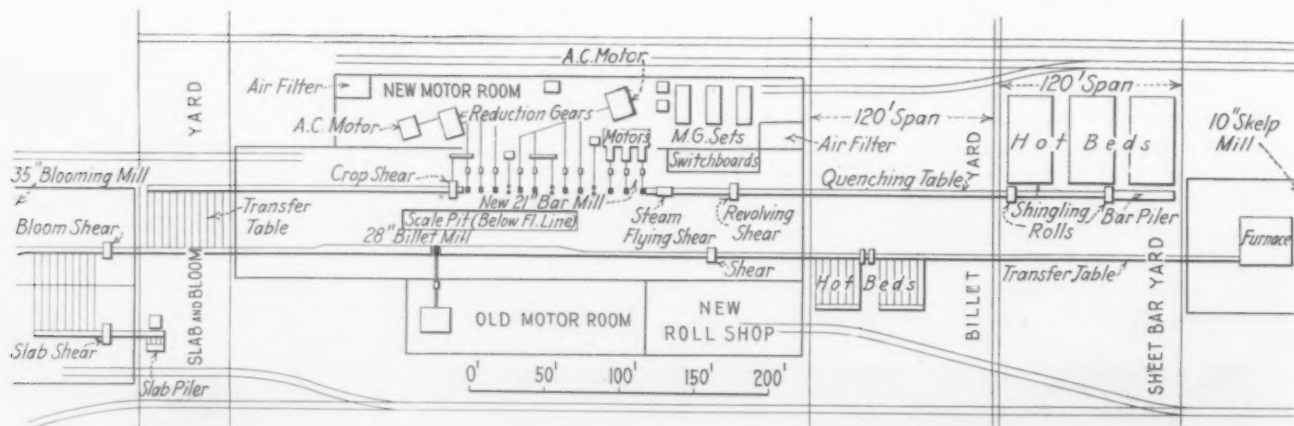
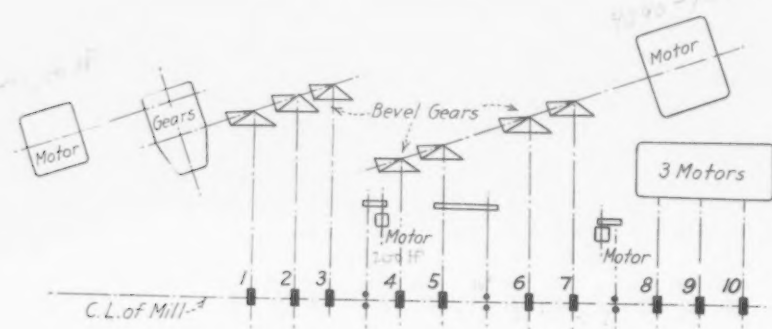
Ten horizontal stands and three edging stands comprise the new 21-in. continuous mill. Rolls on the first three stands, which make up the roughing section of this mill, are 24 in. in diameter. These are driven by a 3600-hp. motor through reduction gears and three sets of bevel gears. Following these stands is an 18-in. edger, which is driven by a separate 200-hp., 300 to 900 r.p.m., 230-volt motor. Stands Nos. 4, 5, 6 and 7 are known as the intermediate section of the mill. The rolls are 21 in. in diameter, and they are driven by a 4040 to 7500-hp. motor through four sets of bevel gears. A 16-in. edger located between stands 5 and 6 is driven from the same large motor. A similar edger, inde-

A short section of table delivers the rolled product to a steam-operated flyer shear, which is used for cutting sheet bars and wide skelp. Then follows a motor-driven, rotary-type shear which is used for cutting the smaller sizes of skelp and other sections up to $\frac{3}{8}$ -in. x 15-in. Each shear has its own automatic measuring device.

Sheet bars or skelp, as the case may be, are then run out on a conveying table to a traveling bar piler located in the sheet-bar yard. The run-out table from the 21-in. mill extends across two storage spaces. The first is the billet yard and the second, in which are located the bar piler and three cooling beds, each 30 x 60 ft., is the sheet bar storage. Each of these yards is 120 ft. wide. The Morgan Engineering Co., Alliance, Ohio, furnished three 15-ton, 120-ft.-span cranes, one of which serves the billet yard and two the sheet bar yard. Sheet bars are loaded on cars by cranes for shipment.

GENERAL Arrangement of Motors and Gearing Driving the Mill (Left). Two large motors were placed "askew," to accommodate clearances

LAYOUT (Below) of the New 21-In. Bar Mill, Showing Also Its Relation to the 28-In. Billet Mill, the 35-In. Blooming Mill (Off the Picture, to the Left) and the 10-In. Skelp Mill (Off the Right Border). Steel passes from blooming mill through the new mill without reheating. The blooming mill feeds, also, the billet mill and a plate mill (not shown)



pendently driven, has been placed between stands 7 and 8, or between the intermediate and finishing sections of the mill. The three finishing stands, Nos. 8, 9 and 10, are driven by separate direct-current variable-speed motors, each rated at 2000 hp., 86 to 165 r.p.m., 600 volts. The rolls in the last three stands are 21 in. in diameter.

As billets are delivered direct from the blooming mill to the continuous 21-in. mill, the question of conserving heat is important. The bars must reach the finishing stands hot enough to be properly worked. To further this condition it was found advisable to space all of the stands in the continuous mill as closely as possible. Their distance center to center is only a matter of some 10 or 12 ft.

In connection with the low-speed motors operating these stands, bevel gears have been used on the first seven regular stands. On account of the speed relations some of these gears are as much as 13 ft. in diameter. This is greater than the distance center to center of the stands. To avoid increasing the spacing between stands, a diagonal arrangement of the motor shaft was used, so that there would be no interference of the one set of gears with its neighbor. This arrangement in sketch form is shown in a diagram.

to the tin mill, and skelp is loaded by the same means on transfer cars for delivery to the pipe mills.

Of special interest in the new mill is the fact that the last run-out table is equipped for "shingling" the bars so that they overlap before reaching the bar piler. This table is designed with inclosed spray boxes for quenching the sheet bars. Water for this purpose is drawn by three motor-driven centrifugal pumps from a 200,000-gal. capacity underground tank. Overflow water drains back to the tank and make-up is taken from the yard mains.

The distance center to center between the 28-in. and the 21-in. mills is 40 ft. The scale pit, which is located between the two mills, measures 21 x 28 ft. It is built of concrete and is lined with rails. A 20-ton Morgan crane serves both mills. Looper tables on the 21-in. mill are hydraulically operated. Roll turning shop space was obtained by building a 110-ft. extension to the 28-in. mill motor house, and rolls are stored between the feed tables to the two mills.

The central pulpit for the five main drives of the new mill is located above and just beyond the last finishing stand. It was built in the wall which separates the mill room from the motor building, so that the operators can readily see into the motor room and also con-



A 16-In. Edger Is Located Between Stands Nos. 5 and 6. A hinged looping table has been placed between this edger and the next intermediate roll stand

trol operations on the mill. Bench board controls are used throughout. Other pulpits for auxiliary motors are located in the incoming end of the building and at the first shear and opposite the intermediate stands. The 18-in. edger, looping tables and roll setting of first and second edgers are controlled from this last station.

Served by a 50-ton crane, the motor room is 308 ft.

long and 47 ft. wide. The roof is constructed of tile made by the Federal Cement Tile Co., Chicago. The tile has been overlaid with cork insulation, which in turn is water-proofed by means of a composition roofing material. The walls are laid up with bricks, the inner surface being coated with aluminum paint.

Air filters made by Midwest Air Filters, Inc., Brad-



The Traveling Bar Piler Has Been Placed Under a 120-Ft. Span Crane Which Serves the Billet Yard

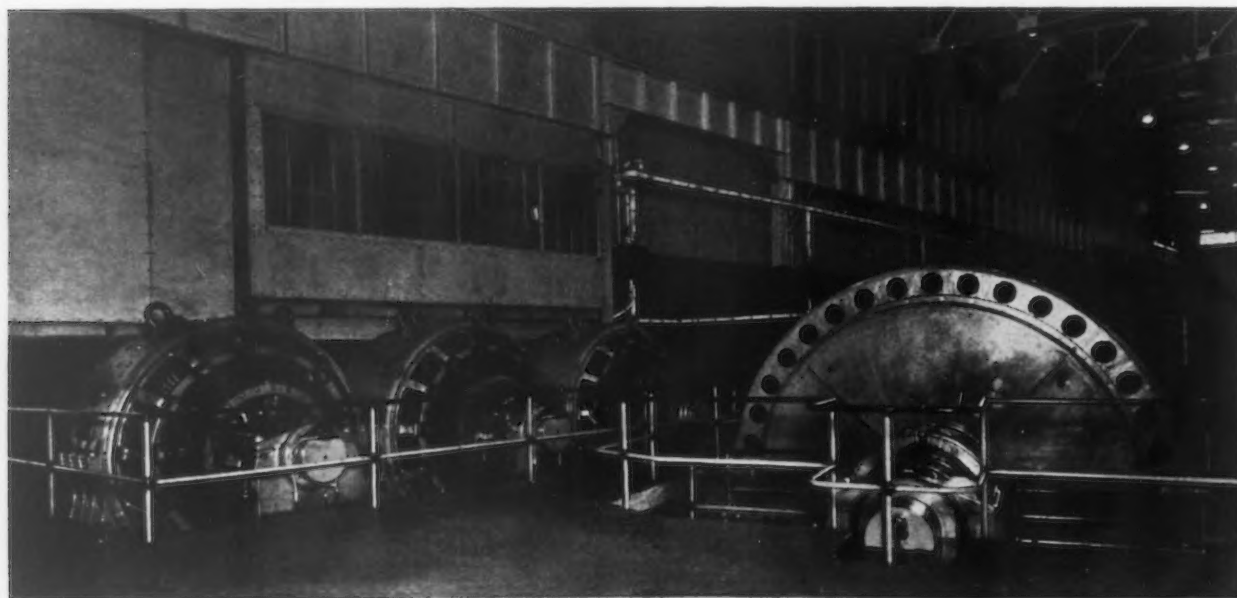
ford, Pa., are mounted in the outer walls. Air which is used for cooling the motors is drawn through the filters by three Sturtevant motor-driven fans. These force the air through the motors, after which it is discharged into the motor room. The switch gear and the substation are located in the basement and the main switch-board panels are mounted on the motor-room floor.

Electric Drive Units

Mill motor equipment consists of five units. The three roughing mills are driven by a 1940 to 3600-hp. induction motor provided with speed regulation from

ator sets of the two-generator type and three synchronous converters, each of which is rated at 1700 kw. The generators are all interchangeable, so that only one set of spare parts is kept in stock. Current is brought to the motor switch gear at 2200 volts, three phase and 60 cycles. Current of these characteristics is used in the two mill induction motors and in the three motor-generator sets.

One generator on each motor-generator set is connected direct to one of the three finishing mill direct-current motors through a Ward-Leonard control system. Speed regulation on the two large induction mo-



Each of the Three Finishing Stands Is Driven by an Individual Motor, as Shown. The main pulpit is located above these motors. At right is the "askew" motor driving the four intermediate stands and the edger operated with them

156 to 290 r.p.m. The 5 to 1 reduction unit on this drive consists of a gear with 147 herringbone teeth and a pinion with 29 teeth. The pitch is 3.14 in. and the faces are 36 in. wide. Each of these three stands is driven through a set of bevel gears. The four intermediate stands are driven through bevel gears by a 4040 to 7500-hp. induction-type motor with speed regulation from 134 to 250 r.p.m. Each of the three finishing roll sets is driven separately by a 2000-hp., 85 to 165-r.p.m., 600-volt, 50-deg. C. rise direct-current motor.

This room also houses three 3400-kw. motor-gener-

tors is accomplished by means of interconnection between the two synchronous converters and the three remaining direct-current generators on the motor-generator sets. This hook-up functions essentially as a Kramer drive.

Steel partitions between the motor room and the mill room are bolted in place, to facilitate removal when repairs are being made to the mill drive. Sheet metal housings over the bevel and reduction gears in the motor room are easily removed by the overhead crane.

Materials-Handling Meeting to Be Held in Philadelphia

Papers and speakers for the national materials-handling meeting of the American Society of Mechanical Engineers at the Benjamin Franklin Hotel, Philadelphia, April 23 and 24, have been announced. At the morning session, April 23, Frank D. Campbell, chief engineer Eastern Steel Castings Co., Newark, N. J., will read a paper on materials-handling methods in his plant. A second paper, "Materials-Handling Features of the DeLavaud Process of Casting Pipe Centrifugally," will be read by H. A. Hoffer, Eastern manager United States Cast Iron Pipe & Foundry Co., Philadelphia.

That afternoon will be devoted to inspection tours, four trips being offered. One trip will be devoted to a study of interior plant handling in Philadelphia; a second, to interior plant handling in Camden; a third, to bulk exterior handling, and the fourth will be a visit to the plant of the United States Cast Iron Pipe & Foundry Co. at Burlington, N. J. At an informal dinner Monday evening addresses will be presented on

certain interesting aspects and sidelights on the materials-handling problem.

A technical session Tuesday morning will be featured by three papers. G. C. Woodruff, assistant freight traffic manager New York Central Railroad, will read a paper on "Modern Handling Methods in Railroad Transportation." This will be followed by "Material Handling on Steamship Piers at Home and Abroad," by Willard C. Brinton, president Terminal Engineering Co., New York. A third paper, "Store-door Delivery of Freight by Motor Trucks," will be read by F. J. Scarr of the Scarr Transportation Service, New York.

Two technical sessions Tuesday afternoon will be devoted respectively to interior handling and to bulk handling of coal, ore, ash, etc. The interior handling papers are two: "Handling Methods and Equipment in a Large Mail Order House," by H. E. Odenath, chief engineer Sears-Roebuck & Co., Philadelphia; "Pneumatic Handling of Materials," by Harry S. Parks of the Holly Pneumatic Systems, Inc., Philadelphia. A technical session Tuesday evening will be devoted primarily to mining problems. The outstanding paper, entitled "Materials Handling," will be read by Harold V. Coes, vice-president Belden Mfg. Co., Chicago, and past vice-president American Society of Mechanical Engineers.

Blast Furnace Practice in Germany

Ores of Various Characteristics Used in Burden— Some Good Coke Available—Methods of Charging Outlined

BY F. H. WILLCOX*

RAW materials used in the Ruhr District of Germany are assembled from Newfoundland, Sweden, Spain, Africa, and from the minette mines of France and Luxemburg. Perhaps 20 per cent of the raw materials originate in Germany. Fifteen years ago the furnaces were based on a larger proportion of minettes and the steel works used Thomas iron, i. e., 0.3 to 0.4 per cent silicon and 1.5 to 3.0 per cent phosphorus.

While the steel capacity of recent installations is largely open-hearth furnaces, usually tilting type, there remains a heavy preponderance of Thomas converter capacity, and the major part of the iron production is Thomas quality. This requires high-phosphorus ores. The basic iron for open-hearth work is very high manganese, up to 4 per cent, always over 2.5 per cent as far as I observed. I believe this is because they concentrate practically all their scrap into the open-hearth, where the pig iron charge is about 25 per cent, the remainder being good plant scrap from mills and pits, with a major part being rather poor light outside scrap.

So the high-scrap heat, with its low iron content, melts down with about a 1 per cent manganese, about the same starting point as with our 50 per cent hot metal of 2 per cent Mn. content open-hearth practice, and is tapped with the same residual Mn. This digression is to explain why they use high-manganese basic pig iron. Manganiferous ore is nil in Germany. The Germans import all of the manganese and conserve it, reusing open-hearth slag and using old ferromanganese and even spiegeleisen slag. This is concentrated, and so-called slag concentrate—running 12 per cent Mn—is recharged. Manganese ore comes from Sweden, Africa and the Near East.

Burdens Most Composite

With such wide sources of supply the burdens found at various plants are of the most composite character. One extreme case was a three-furnace plant, each stack with 17,000 cu. ft. capacity, producing 1500 to 1800 tons of iron a day and using 32 different iron-bearing materials.

An inland plant nearby used a burden made up of 40 per cent Wabana, 20 per cent high-grade lump minette, and 40 per cent roasted and sintered German spathic and limonite ores, together with the usual plant by-products. Going over toward Dortmund, one large plant was using 85 per cent Swedish magnetites, about 40 per cent sintered, with the remainder made up of manganese ore and plant by-products, while at an adjacent operation Wabana made up the major part of the burden. At Bochum, with four furnaces, the burden was made up of sinter, produced from a mixture of flue dust, Spanish, African and Swedish concentrates, all fines, mixed with from 8 per cent to 12 per cent coke braize and sintered on Dwight-Lloyd machines. The Swedish would correspond roughly to our Harmony concentrates in fineness, but the hematites were seemingly as fine as flour.

Low-Grade Native Ore Not Much Used

Germany has considerable ore reserves in Bavaria and southern Germany. They are low-grade and apparently have to be roasted before they can be con-

centrated. It has been found cheaper to import ores than to develop the low-grade deposits. It is interesting to note that the turn toward imported ores has given the Ruhr District a distinctly better grade ore to work with than was the case formerly. It gives a distinctly superior burden, as compared with our somewhat easily reducible ore burdens. The magnetites, sinters and probably Wabanas are not so quickly affected by the reducing influence of the furnace gas.

Their smoothly working furnaces have a practice which follows that of our Eastern district, where mixtures have been used for many years ranging from 20 per cent sintered ores and 80 per cent hematite, up to 85 per cent sintered ores and 15 per cent hematite, not to mention the 100 per cent sintered ore practice. Such burdens invariably give lower blast pressures, lower coke and greater regularity, the furnace taking heat—even on unfavorable lines—without serious tendency to stick and hang.

They use some ores in a lumpy condition which I think we would refuse to charge. In two plants we are designing for Germany we have to provide clearance in the throat for 14-in. lumps. It is surprising that the German furnaces work as well as they do. It is again surprising, at first glance, that, working with a burden naturally coarse, they show so much interest in rendering fine ores coarser.

I think this can be traced to two factors: First, the fear of fine ores is well founded because many plants where the tonnage has been brought up are blown by gas engines that cannot keep the volume up with much over 15 lb. blast pressure. Moreover, the production of Thomas iron, with its lower silicon, is more sensitive, and, regardless of furnace lines, combustibility of coke and slag characteristics, high blast pressure has to be avoided. Second, the Germans have materials that naturally have to be agglomerated or nodulized or sintered—the latter process being later in practice than with us. Some of the Spanish and Algerian ores are finer than any we have to contend with and are as dry as a bone, and then large quantities of undesirable grades, like pyritic residue and spathic ore, have to be treated.

Sintering African Ores Difficult

I was informed that it is not so easy to sinter fine African hematite ores as a mixture of hematite and magnetite. The tonnage in the Dwight-Lloyd machines drops off by 20 per cent. In this respect, I believe they check our experience with flue dust and a well prepared magnetite concentrate, such as is found at Chateaugay. However, their Dwight-Lloyds are not so well laid out as are certain of our sintering plants with respect to return of screenings for admixture with the fine ores.

They often have good preparation plants for the mixture of ores, the different components being weighed in correct proportion, put through a concrete type mixer before being charged on the machine. As compared with the rate of production here, they run slower on a tons per square foot per day basis. The quality of sinter is poor, compared with some of the American sinter, but it is so much superior to an admixture of fine hematites and magnetites that it is not difficult to see justification for the practice. Their cost is stated to be 35c. a ton.

Swedish shippers are said to screen out the lumps,

*Vice-president Freyn Engineering Co., Chicago. This is an abstract of an address before the Eastern States Blast Furnace and Coke Oven Association, at the William Penn Hotel, Pittsburgh, on Feb. 17. A second and concluding installment will be published in an early issue.

(Concluded on page 842)



Thousand-Ton Structure Welded

Simplicity of Joints in Trusses and in Erection Details Eliminates
Several Thousand Gusset Plates and Short Angles—
11 Per Cent Saving in Steel Effected

A LARGE manufacturing building has been erected by the General Electric Co. at its West Philadelphia, Pa., plant, in which the structural steel was fabricated and the erection joints were made by means of metallic arc welding. The building, shown in end elevation in the view, is approximately 145 x 550 ft. A line of columns runs down the center, thus dividing the structure into two bays, the one to the left being equipped for overhead cranes.

Steel was fabricated in the Trenton, N. J., plant of the American Bridge Co., which also erected it. The structure weighs 989 tons, of which 745 tons passed through the welding shop. The remainder is made up of purlins, punched for angle-iron connecting clips, and erected by bolts. A design made for the more conventional riveted details was figured to weigh 1114 tons; thus a saving of 125 tons, or over 11 per cent, was made in the weight of steel.

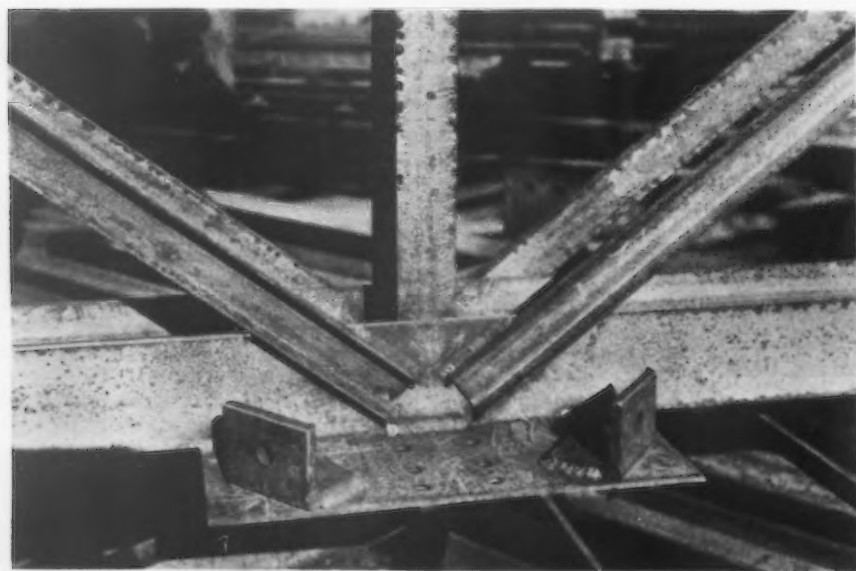
Prof. Frank P. McKibben, formerly of Union College but now consulting engineer for the owners, described the structure in detail at the Philadelphia Engineers Club, March 14. He said that this building is notable for its size, weight and the use of heavy roof trusses, but that it merely represents an orderly development of a new art. He has data concerning 35 buildings with frames either wholly welded or welded in great part; of 25 miscellaneous structures which have either been constructed or reconstructed and reinforced by welding, and 15 ships or barges which have completely welded main frames.

He believes that arc welding has a very promising future for steel truss work, because it requires less steel and is a cheaper method of fabrication, yet producing just as good (or even a better) a joint, and with no noise. The problems yet to be solved before the method is widely used are (a) revision of building codes and education of building inspectors, (b) methods of insuring the skill of welders, (c) educating the draftsmen and detailers, (d) devising proper shop fixtures and jigs and (f) adapting automatic welding machinery.

As indicated by the view, the truss is assembled without gussets, except for the lateral bracing, and the metal is symmetrically placed. All the welds are so placed as to act in shear. Previous tests had shown that a $\frac{3}{8}$ -in. fillet has an average ultimate strength in shear of 13,400 lb. per linear inch, and a $\frac{1}{4}$ -in. fillet, 10,900 lb. A design stress of 3000 lb. per linear inch of $\frac{3}{8}$ -in. fillet weld was adopted, thus giving a factor of safety of 4.5.

Column details are very simple. As shown in the photograph, the loose base slab was usually grouted to correct level, and the Carnegie H-beam column with milled end was placed thereon. The single-angle bolt bracket is much more economical than a riveted detail requiring at least five nicely fitted pieces.

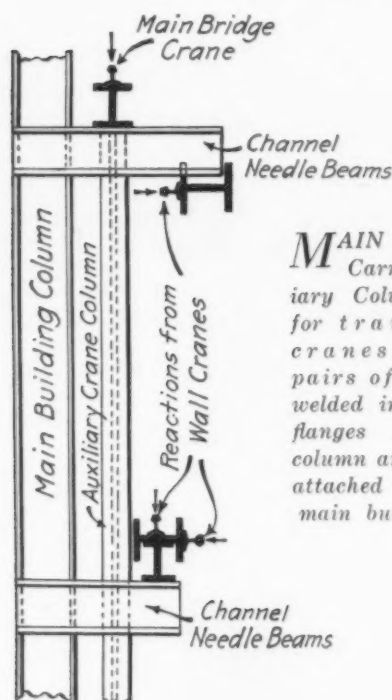
A $1\frac{1}{2}$ -in. cap plate was welded to the top of each column, and clip angles to land the lower chords of roof trusses and longitudinal wall trusses. These connections were punched for erection bolts, but were later welded to take all working stresses. It may therefore be seen



LOWER Panel Point of Roof Truss. Chords of main trusses are 8-inch Carnegie H-beams, placed with web horizontal. Verticals are 7-inch I-beams slipped between upstanding flanges, and edge welded. Diagonals are pairs of channels, welded to sides of chords. Gussets for horizontal bracing in plane of bottom chord are welded to lower flanges of bottom chord

that one feature of the building is the extreme simplicity of all connections, both in the shop joints and the field joints, thus avoiding the expense of making, routing and assembling several thousand small clip angles, gussets and fillers, and reducing the fabrication expense more than the value of the steel saved.

Two fundamentals of procedure control were also discussed by Professor McKibben, namely, verifying the

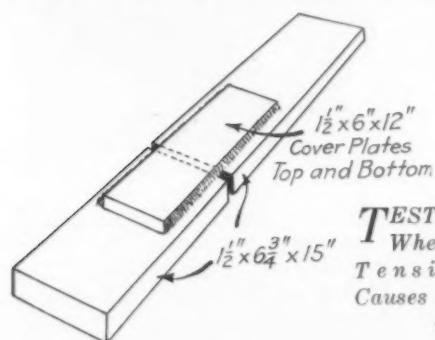


MAIN Crane Beams
Carried on Auxiliary Columns. Beams for traveling wall cranes supported by pairs of channels, welded in the field to flanges of auxiliary column and to brackets attached to web of main building column

skill of the workmen and testing the completed structure. The five workmen who welded the trusses in the Trenton shops were required to make test pieces. These developed the following strengths in shear:

Welder	Bars, Lb. per Inch	Welder	Bars, Lb. per Inch
A	13,267	D	11,551
B	12,070	E	11,158
C	12,785		10,566
	12,063		10,137
	12,057		
	11,393		

"While the two specimens made by any individual welder showed remarkably close results, the variation between the poorest and best welder was about 22 per cent of the lowest," said Professor McKibben. "The lowest values, however, were practically the same as those used in design. Taken in connection with other



TEST Piece Which, When Pulled in Tension Machine, Causes Welds to Fail in Shear

tests and accomplishments of these five shop welders, it is believed that these few specimens represent shop variations. These are no greater than exist in concrete tests, or in riveted-joint tests."

To test the completed trusses, three were taken and erected on cribbing with the regular cross bracing. Then the center was loaded to twice the maximum design load. The deflection measured 0.89 in. (less than the calculated 0.97 in., because of continuity at all joints). When the load was removed, the deflection returned to zero, which showed there had been no permanent set in any member or slip at any joint.

J. H. Edwards, chief engineer American Bridge Co., in discussing Professor McKibben's paper, said that, after some three years' study, experimentation and practical application, he would have no hesitation in ac-

cepting a welded structure if it were designed for the purpose by competent engineers and fabricated and erected by skilled workmen.

Fabrication of the trusses for the West Philadelphia building required a minimum of shop preparation. Five welders did the work, each using a "single-operator motor-generator set." Two of these sufficed for the erection. In the shop a series of 18-in. I-beam skids 24 ft. long were placed about 9 ft. apart, blocked level, and connected together with a steel bar, welded to each beam. The positive terminal of each welding machine was bolted to the web of one of these beams. The large trusses were put together by first laying the bottom chord against a long 8 x 8-in. angle, welded to the I-beam skids and bent to the proper camber. Then



Column Foot Saves Five Pieces for Every Foundation Bolt

the top chord was spaced and clamped to the skids. Finally verticals and diagonals were clamped to the chords with C-clamps, and the joints were welded. All trusses were assembled and welded lying flat on the skids.

The 206 skylight trusses were nearly alike and were assembled in jigs. These fixtures were made by tack-welding flat plates to skids, then welding small clips to the plates so that when the truss members were laid against the clips the truss was properly assembled for clamping together. It is then either welded in place, or removed for welding while another truss is being assembled.

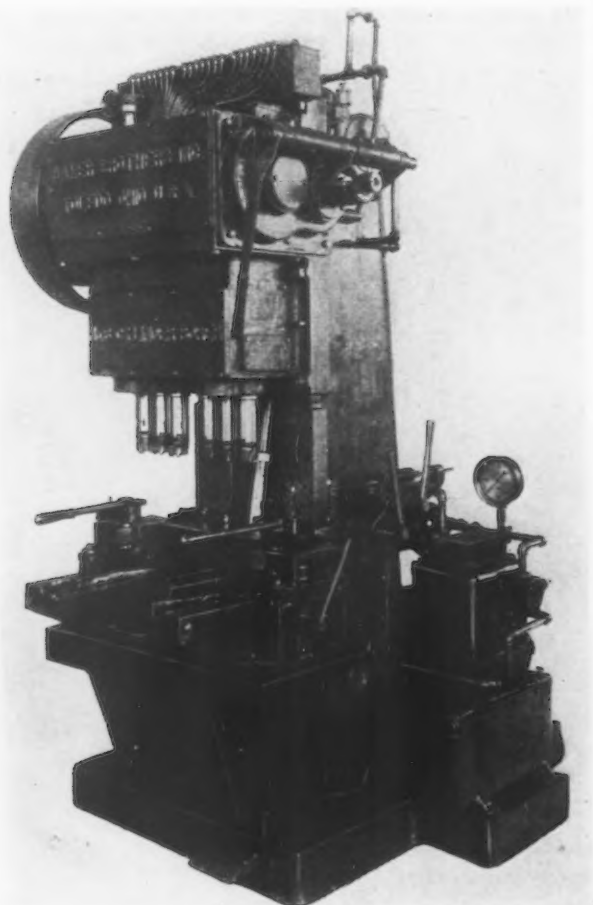
Fabrication and erection took nearly two months.

* M. E. Hibbs, representing the Philadelphia Bureau of Building Inspection, said the principal obstacle in his mind preventing a readier acceptance of welded structures was the supposed difficulty in distinguishing a good weld from a bad one after it has been made. Primarily that would be the first duty of an inspector of such structures. But after he had visited a welding school and had had an opportunity to compare the work of beginners, apprentices and expert welders, he found that quality was as easily discernible in such joints as in any other of the more familiar varieties. He was of the opinion, however, that some shapes are more adaptable to welding than others; consequently the Philadelphia regulations now include a provision that certain shapes may be rejected by the chief inspector.

Multiple-Spindle Cylinder Boring Machine with Hydraulic Feed

Simplicity of design is a feature of the new multiple-spindle cylinder boring machine with hydraulic feed which has been added recently to the line of Baker Brothers, Inc., Toledo, Ohio. The machine is built with fixed centers to individual requirements, and can be furnished for two, four, six or eight-cylinder blocks.

Spindles are of forged high-carbon steel and are of maximum diameter permitted by the center distance of



The Hydraulic Feed Cylinder Is Mounted at an Angle So That There Is a Thrust Component Which Holds the Table Rigidly Against the Ways, Assuring Positive Alinement

the bores of the blocks. Two adjustable taper bearings of ample size are located at the lower end of the head, as close to the start of the cut as possible. The bearings are long and are accessible for adjustment when necessary. It is claimed that machines of this design are being used by a number of companies without any support for the bars, boring both roughing and finishing cuts with a guaranteed accuracy. This, it is pointed out, means greatly simplified tool set-up.

Feed of the table is actuated by an Oilgear hydraulic pump, which provides rapid advance to the work, automatic engagement of feed at a predetermined point, rapid return, and automatic stopping at the end of the cycle of the machine. The position at which changes from rapid traverse to working feed take place may be made conveniently, the changes being by means of flat cams which may be set at any position. The rate of feed may also be adjusted readily. The rapid traverse and quick return are constant.

The table is equipped with taper take-up gibs and has an extra long bearing on its ways. Feeding of the table is accomplished through the hydraulic cylinder which is mounted on a pivot at the top of the main frame of the machine. This cylinder is arranged at an angle and it is stated that, in addition to feeding the table up there is also a thrust component which at all times holds the table rigidly against the ways of the machine, further assuring positive alinement and accuracy. Careful analysis of conditions is said to have

been made in determining the proper angle to give the results desired.

Either belt or motor drive arrangement can be furnished. The main drive to the spindles is through hardened alloy-steel gears with the shafts mounted on ball bearings. Speeds for the spindles are designed with consideration to the size of bores of the cylinder block to be machined. Mechanical start and stop of the spindles is provided by means of a conveniently located lever. Feeds are variable through a wide range through the Oilgear pump. An automatic lubricator provides adequate lubrication for all gears and bearings on the machine. The Oilgear pump is driven by a 2-hp. motor, and this is furnished as part of the standard equipment.

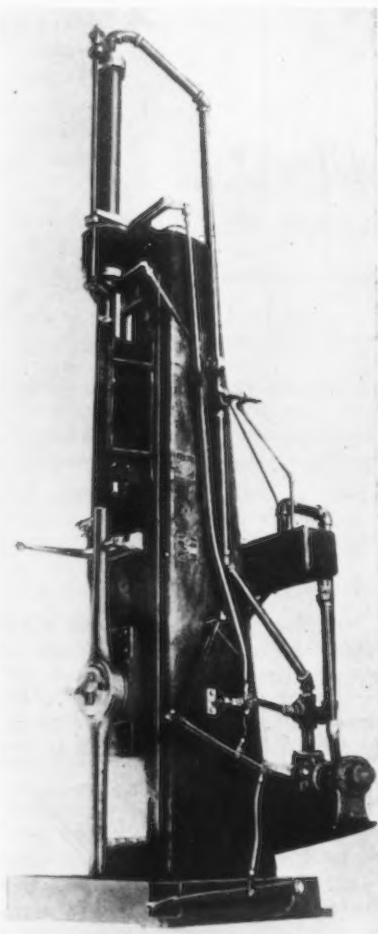
Special Hydraulic Axle-Housing Broaching Machine

For broaching out the flash thrown up from welding operations on axle housings, the American Broach & Machine Co., Ann Arbor, Mich., is offering the special hydraulically operated broaching machine shown in the accompanying illustration.

The machine, shown without the broach in place, is equipped with a rotating head that holds the broach. On the downward stroke the broach cuts out the flash metal left by the welding operation, and upon completion of the cut the head rotates by means of a cam device attached to an angle plate, which is bolted to the frame of the machine. The head rotates so that the broach may be positioned out of the path that it has traveled in its downward stroke. This brings the cutter out of line of contact with the metal surface that it has cut, permitting it to return through the housing without interference. This prevents dragging of the tool on the return stroke.

The axle housing is mounted on a large stud and is centered by means of a centering device at the upper end. It is claimed that both ends of the housing are broached in approximately 1 min.

Direct motor drive from a 10-hp. motor is employed. Automatic stops regulate the length of stroke, and both foot pedal control and hand lever control are provided. The machine is of 12-ton capacity and the stroke is 24 in. The operating height is 17 ft. overall.

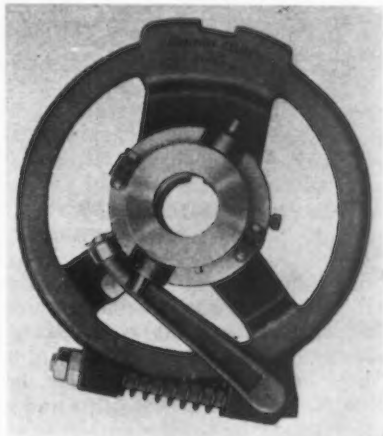


Orders for 967 steel boilers were placed in February, as reported by the Department of Commerce. These aggregated 1,150,711 sq. ft. of heating surface, compared with 859,301 sq. ft. in 1029 boilers in January. The February rating is the highest for several months, but is considerably lower than that of February, 1927, when 1101 boilers of 1,389,984 sq. ft. were ordered.

Contracting Band Clutch of Compact Design

The Conway Clutch Co., Cincinnati, has placed on the market a new contracting band clutch of simple design and compact construction, both as to swing diameter and lengthwise shaft space required for a given horsepower. Ease of engagement, instant release, drag-free idling and unusually high power capabilities are features claimed. The device is available in four sizes

Ease of Replacing the Friction Lining Without Removing the Clutch From the Shaft Is a Feature



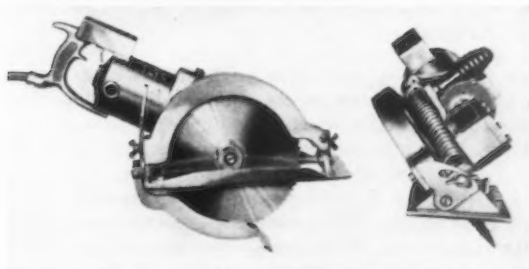
for transmitting up to 75 hp., at 100 r.p.m.; the diameters of the friction surfaces range from 12 to 20 in.

This clutch is operated by the familiar form of shifter yoke which slides a cone member under a roller on the end of an operating lever. When the cone slides under this lever, contracting the friction band, high leverage ratio causes the application of ample driving power. When the operating lever is thrown in the reverse direction to release the clutch, a spring assists in throwing the friction band out of engagement. The clutch is of steel and the shifter cone, also of steel, is hardened. As the shifter cone is pushed under the operating roller, the lever slides on a finished surface on the clutch carrier. This takes the end thrust and allows this lever to move freely up and down.

Ease of replacing the friction lining, without removing the clutch from the shaft, is a feature emphasized. By removing two screws and moving the pulley, sprocket, gear or drum along the shaft a distance of slightly more than the width of the friction band, the latter can be slipped over the line shaft.

Portable Hand Saw with Provisions for Bevel Sawing

Bevel sawing at any angle up to 60 deg., as well as the usual vertical sawing, may be done with the new portable electric hand saw recently brought out by the Wodack Electric Tool Corporation, 4627 West Huron Street, Chicago. The bevel sawing is accomplished by a



Bevel Sawing Is Accomplished by a Tilting Saw Base

tilting saw base which may be set and locked at any angle within the 60-deg. range by means of a slide and locknut.

Another feature is the width gage for vertical sawing, which can be set for widths up to 6 in. and is intended to permit sawing strips of various widths with uniform accuracy and without the necessity of marking.

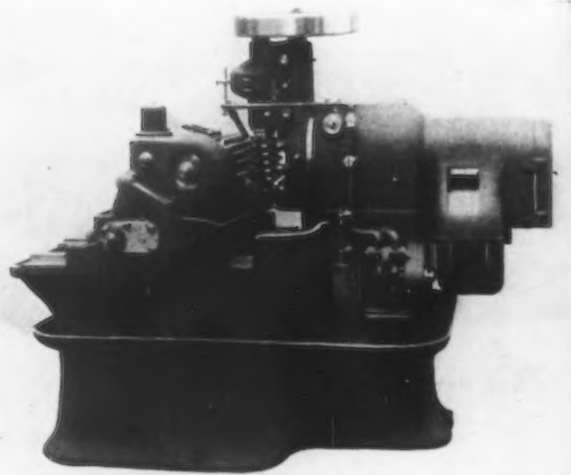
The machine, which is designated as the type B, is equipped with a General Electric motor which operates on both alternating and direct current and is available for 110, 220 and 250 volts. Regular equipment includes one 9-in. and one 11-in. saw blade.

Production Hobbing Machine

A high production Pfauter hobbing machine, said to be suitable for spline shafts and spur gears of small diameter, coarse pitch and wide face, and for worms for automobile rear axles, is being introduced by the O. Zernickow Co., 15 Park Row, New York.

The machine is designated as the No. 9, and has a capacity for gears up to 10 $\frac{1}{2}$ in. in diameter and up to 2 $\frac{1}{4}$ D.P. It has single pulley drive and can be arranged for direct-connected motor drive, a 7-hp., 1000-r.p.m. motor being employed. Hob speeds are obtained through change gears which have large tapered bores and may, therefore, be easily put on or taken off. The cutter head swivels 100 deg. in either direction. The setting is accomplished by means of a worm drive located inside of the head.

The hob is driven by means of a spur gear drive having a heavy flywheel on the driving pinion to impart steady motion to the hob. The hob spindle is hardened and ground and is adjustable lengthwise and sidewise. The index drive consists of an accurately cut worm gear and a hardened worm which is ground all over.



The Cutter Head Remains Stationary While the Work Travels. The work is held between centers or in split collets

The worm runs in a bath of oil and is adjustable in both directions.

The cutter head remains stationary while the work travels. The work is held between centers or in split collets. Radial pressure of the hob is taken on a steady-rest. Feeds are obtained through change gears and the feed may be stopped automatically or by hand. All outside change gears are inclosed within cast-iron guards, but are accessibly located. The coolant tank is located in the bed of the machine.

Specifications include: Swing, 10 $\frac{1}{2}$ in.; distance between centers, 21 $\frac{1}{2}$ in.; minimum center distance, hob and work arbor, 1 $\frac{1}{4}$ in.; number of teeth, 4-100; bore of spindle, 3 $\frac{1}{4}$ in.; diameter of hob arbor, 1 $\frac{1}{4}$ or 1 $\frac{1}{2}$ in.; maximum diameter and length of hob, 5 $\frac{3}{4}$ in. and 5 $\frac{1}{2}$ in., and adjustment of hob, 1 $\frac{1}{2}$ in. Speeds of hob are: 44, 53, 67, 84, 106 and 127 r.p.m. The floor space occupied by the machine is 69 x 86 in., and the weight, net, is 5500 lb.

A newly designed calculator that weighs less than 7 lb. is announced by the Burroughs Adding Machine Co., Detroit. It is equipped with regulation size keys, a standard keyboard, visible adding dials and the like, and is 6 $\frac{1}{2}$ in. wide and 11 $\frac{1}{4}$ in. long.

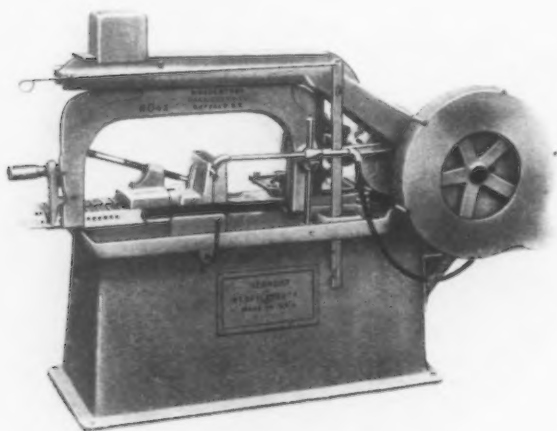
Employment in February showed a good gain over January in the barometer of the National Metal Trades Association. The total reported went up from 583,118 to 602,457, or 3.3 per cent.

Production Metal-Cutting Power Hacksaw

The W. Robertson Machine & Foundry Co., Buffalo, N. Y., has placed on the market a new power hacksaw, designated as the No. 4X, the rated capacity of which is 9 x 9 in.

The machine is of heavy construction and all parts under strain are of alloy steel. The base is of box type and forms a receptacle for the cutting fluid. Bearings are large. There are two shafts, the back or drive shaft, which is 1 in. in diameter and is suspended in a 13-in. long steel sleeve, and the main shaft, or crankshaft, which is 1½ in. in diameter and runs in a 6¼-in. long head bearing. These bearings, as well as the connecting rod bearings, are phosphor-bronze bushed. The outer ends of these two shafts are supported in bearings formed by the heavy overhanging gear guard. The frame has a 2½-in. flat dovetail bearing, 14 in. long, running in a hand-scraped bearing to match, with gib for adjustment. All gears have teeth cut from the solid.

Frame speeds of 72 or 100 strokes per min., for cutting hard or soft metals, are available. Change of speed is made by a push or pull on a button lever at the end of the drive shaft. The drive of the machine is from a single pulley on the drive shaft and through the gears to an expanding clutch on the crankshaft.



The Saw Frame Is Lifted by an Oil-Compression-Lift Device to Relieve the Blade Teeth of Back Drag on the Return Stroke

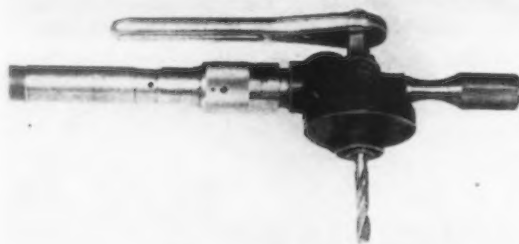
No countershaft is required. Motor driven types are driven direct from a fiber pinion on the motor shaft to a cut gear on the machine which replaces the pulley. The clutch, which nests inside the large gear, is 4½ in. in diameter, 1 13/16 in. face, and is expanded by a hardened steel cone. It is engaged by a conveniently located extended lever and disengages automatically when the cut is completed.

The machine is equipped with the company's oil-compression-lift device, which serves to lift the frame and relieve the teeth of the saw blade of all drag on the return stroke. This feature also serves to prevent falling of the frame on the work, eliminating breakage of blades. The device is arranged so that when the machine stops at the end of the cut the frame will stay at any position of its swing until released by the opening valve. Feed is obtained by gravity with the aid of the large weight which is adjustable on a T-rail cast on the top center of the main slide bearing. This arrangement is intended to eliminate the vibration of a weight rod and to apply the feed directly over the center of the blade.

Coolant is pumped from the receptacle in the base to any part of the blade by means of a piston pump and an adjustable piping arrangement. The vise is quickly adjustable up to 9 in. and may be swiveled to 45 deg. for cutting stock at angles. Blades 12 to 18 in. may be used. For motor drive a ¾-hp., 1200 or 1500-r.p.m. motor is employed. The height of the machine overall is 41 in., and the working floor space is 26 x 62 in. The net weight of the belt-driven unit is 700 lb.

Angle Drilling Head for Use With Flexible Shaft Equipment

For drilling in inaccessible locations, where an ordinary electric drill or hand bit cannot readily be used, the Stow Mfg. Co., Binghamton, N. Y., is offering the angle head illustrated. The tool derives its power



The Device Is Intended for Use in Inaccessible Locations

through flexible shaft that may be driven by an electric drill or by any other available motor. The device is of rigid construction. It is regularly available in ½-in. capacity, but may be furnished in other sizes and with 1¼-in. screw feed with ratchet handle. The socket takes Morse taper shank drills and where space permits a chuck may be applied.

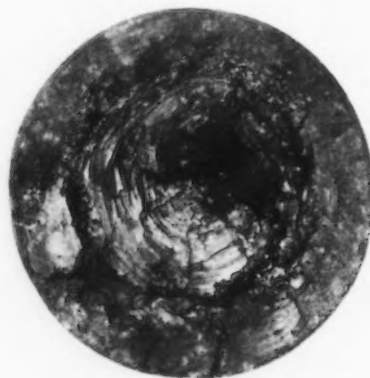
Axle Failures from Hot Boxes

In the course of a paper on "Types of Failure of Steel," Robert Job, Milton Hersey Co., Ltd., Montreal, Que., read before the midwinter meeting of the American Society for Steel Treating, a fractured freight car axle (known in shop parlance as a "burn-off") was shown. It was dark and discolored on most of the surface, and at places had a magnetic scale adhering. A crater-like spiral of shear surfaces is characteristic of such failures.

The cause was an excessive hot box, which actually caused the axle to run red hot, and the wheel twisted off in the hot soft metal.

Other failures caused by creeping fracture from a tool mark or a sharp fillet were illustrated. Incipient cracks may sometimes be determined by cleaning the

*"Burn-Off"
Failure of
Freight Car
Axle*



surfaces carefully, painting with thin white lead and then sledging the axle on its end. A little ridge in the paint will be a tell-tale of a fine crack.

S. W. Miller in discussion said that hot boxes were likely to cause more serious trouble than often appreciated, especially if the bushings were made of copper-tin bearing alloys. This bronze penetrates readily into hot steel, inducing brittleness. Consequently it is good practice to polish the bearing surface on the steel axle after it has run hot and before repacking, and examine it minutely with a high-powered reading glass to discover stringers or tiny threads of bronze embedded in the steel surface.

The new battery of 63 Koppers-Becker by-product coke ovens of the Tennessee Coal, Iron & Railroad Co., Fairfield, Ala., recently was started. There are now 497 ovens at this plant with an annual coke production of 2,436,250 net tons.

Labor Time Recorded by Machine

Electro-Mechanical Dispatching Device Used by Workmen to Signal
Job-Time Changes to Central Board

AN electro-mechanical dispatching device by means of which workmen signal job-time changes to a central board was described by K. R. Wood, works manager Bell & Howell Co., Chicago, at a machine shop practice meeting of the Chicago section of the American Society of Mechanical Engineers, held at the Morrison Hotel, Chicago, March 14. With this equipment it has been possible to eliminate several handlings of shop "paper," to cut the timekeeping force in half, to stop production leaks and to avoid confusion.

When notice of a change from one job to another is dispatched by the workmen to the central station, the change is recorded and the elapsed time is figured. This is accomplished by means of a "temporator" which operates by a dialing method. The central station closely resembles a telephone switchboard in that it has its plugs, jacks and signal lamps. It is different in one respect, i.e., the human voice does not enter into its operation. The dials which the workmen use are the same as those employed in automatic telephones. At the central station the indicating device is a step-by-step mechanism which reveals visually behind a window a row of digits corresponding to the code number dialed by the workmen. Not only does the digit or letter dialed appear in front of the central station operator, but it shows up also in a window at the top of the sending unit. These dispatching units are placed in convenient positions about the departments, wherever there are workmen who have occasion to report direct labor.

Job time cards are printed both in red and in black, and they are alternated daily. Thus one color of card carries Monday, Wednesday and Friday, and the other, Tuesday, Thursday and Saturday. When one set is in use at the central board, the preceding day's cards are in the hands of the accounting department where a disposition is made of elapsed time against the cost card. This dispatching method makes possible the accumulation of the elapsed time on cost cards with but one handling between workmen and accounting department.

The routing or shop order is made in quadruplicate and it carries all the information necessary for directing the routing of tools and work to the department, the reporting of time change, the allowed time to perform the work and the number of pieces to be made. One copy is put into a pocket at the central temporator board and filed under the department heading. The second copy similarly goes into one of a series of pockets at the foreman's desk. The third copy serves as a "traveler" and remains with the work as a means of identification. It is this copy which is used by the workman to dial his time change. The fourth copy is sent directly to the tool storage crib, where it gives information so that tools necessary to perform the work may be turned over to the transfer clerk who dispatches them to the job. This copy is then returned to the central station, where it is placed in a follow-up file against the starting time of the job. Only the first two copies of the routing order bear the allowed time of the operation. Thus, this information is in the hands of the planning department and the foreman only.

As the workman nears the completion of a job upon which he is working, the foreman assigns him his next job. When the job in hand is finished the workman notifies the central office of all the facts by means of

the temporator. He steps to the nearest signaling station, presses a button, is assigned a line, and dials his department and check number, the operation number, the design number, the number of pieces completed, together with the symbol for "job finished."

There are available in the temporator apparatus 12 digits and symbols, so that the numbers may be dialed without clearing the line and starting a fresh series. These 12 separate digits are arranged as follows: At the left comes first one letter, then five digits, then two letters and finally four digits. This is sufficient to give all the necessary information relative to finishing the job in hand. After this information has been transcribed by the central operator, the line is cleared and the workman repeats the dialing in reference to the new job about to be started.

While this is going on, the central operator reaches for the job time card in the file and strikes it twice in the time clock—once for a finished job, and once for new job—records the number of pieces completed, the work station, operation number and manufacturing order of the job started. He then passes this card along to an assistant operator, who pulls the routing orders for both jobs and stamps them in the time clock. The assistant then refiles the new job order and turns over the order covering the finished job to the planning clerk who uses it in bringing his pre-planned graph up to date, recording the whereabouts of work in process.

When the planning clerk is through with it the order card is turned over to an assistant who figures the elapsed time against the number of pieces made and time allowed. If the time is bettered, this is recorded on a labor analysis card to be used in the future as allowed time on the job when it is run again.

An interesting feature of the control concerns the watching of elapsed time. If the foreman is doubtful about any job, or thinks he is losing time on it, he is privileged to signal through the temporator signaling station nearest his desk to the central board for a check-up figure. The central operator then dials back to him the total elapsed time on that job. This gives the foreman an opportunity to catch up or speed up on his work before it is too late.

Automobile Production Records Large Gain Over January

WASHINGTON, March 20.—Showing an increase of 91,721, production of motor vehicles in the United States in February totaled 323,368, against 231,647 in January, according to reports received by the Department of Commerce. Of the February output 290,830 vehicles were passenger cars and 32,538 were trucks, compared with 205,543 passenger cars and 26,104 trucks in January. Output in Canada in February totaled 12,504 vehicles, of which 10,315 were passenger cars and 2,189 were trucks. Canadian production in January totaled 8463 units, of which 6705 were passenger cars and 1758 were trucks.

February made the largest United States total since last May, when 404,106 vehicles were produced—357,150 passenger cars and 46,956 trucks. It showed a larger total than in February, 1927, when 304,763 vehicles were turned out, but was exceeded by February, 1926, with 364,180 units.

Schedule of the next instalments of the Business Analysis and Forecast, by Dr. Lewis H. Haney, Director New York University Bureau of Business Research, follows: March 29—General Business Outlook; April 12—Activity in Steel Consuming Industries; April 19—Position of Iron and Steel Producers.

Business Analysis and Forecast

BY DR. LEWIS H. HANEY

DIRECTOR, NEW YORK UNIVERSITY BUREAU OF BUSINESS RESEARCH

Current Statistical Data, Considered Independently
of Trade Opinion, Indicate That:

Gradual rounding off of unfilled orders may indicate approaching lessening of activity and difficulty of long maintaining the new prices.

Pig iron production has come into line with ingots. But prices probably will not advance while coke and scrap prices are weak.

Commodity prices have begun a downward movement which is accelerating and may cause steel prices to follow by mid-year.

IN a good many respects, we find the steel industry at the beginning of March in much the same position as in December, 1925. The rise in the output of steel ingots has been checked after a sharp advance, and the unfilled orders of the Steel Corporation have tapered off in their ascent. Prices of finished steel have risen slightly for three months, but the upward tendency is losing its momentum. Pig iron production has been increasing, but is gaining on the steel-making requirements and prices are barely holding a small rise. Sheet prices are higher. At the same time, the price of steel scrap is sagging.

The chief differences between the two periods lie in the facts that the whole price structure in the iron and steel industry is lower now, and that coke is weak, while at the end of 1925 it was about to begin the rise which occurred in January, 1926. Also, the activity in the chief iron and steel consuming industries averaged a little higher at the end of 1925 than it does now and was notably so in the automobile industry. Building activity, however, is now higher than then, making due allowance for seasonal conditions. On the other hand, the output per employee and per dollar of payrolls is higher now than in the earlier period and it is not improbable that the January earnings of the more efficient steel companies will be about as good as in December, 1925.

The similarity of conditions in the two periods seems sufficiently marked to suggest that, as was the case in the earlier time, the industry is now near the peak of a short period of expansion, and is likely to round off in another month or two.

Three Barometers Point Upward

WE find ourselves this month in the pleasant situation of noting that all the curves in the steel chart point upward—production, unfilled orders and finished steel prices. This is as one likes to see the trends in the nation's basic industry. Moreover, some encourag-

ing features are apparent to one examining the chart. In the first place, even after making adjustments to eliminate the merely seasonal variations, the unfilled orders curve has risen to the highest point since March, 1926. It is nearly up to the average of the last five years. It has risen well above its average relationship with the price of finished steel, as indicated by the price curve in the chart. This condition usually means higher prices, and the advance in the price index for February was the answer. There has been no comparable advance in the monthly average price of finished steel since December, 1924. The price level in February was back to about where it was in the months of stability last summer (June, July and August).

Average daily steel ingot output is seen to have increased but slightly in February, when allowance is made for the usual seasonal variation. Usually the average daily production gains more than 4½ per cent in February; the increase this year was hardly 5½ per cent. Accordingly, the adjusted index is 105.3 per cent of normal against 104.7 per cent in January. It compares with 105.4 per cent a year ago, thus being practically at the same level (after making conservative allowance for normal growth). It is reassuring to find this moderation in the rate of activity in steel production, for it indicates that the steel makers are adjusting production to demand and proceeding cautiously. Production is 5 per cent above normal requirements, but, in view of the sharp gains in the building industries, which are doubtless reflected in the increase in unfilled orders, the February level seems reasonable enough.

Perhaps the least favorable aspect of the situation is seen in the marked rounding off of unfilled orders, the increases having been successively smaller in each of the last two months. Presumably, this means that new business has not gained as fast as shipments. Such a rounding off almost always marks the approach of a decline in the unfilled orders of the Steel Corporation.

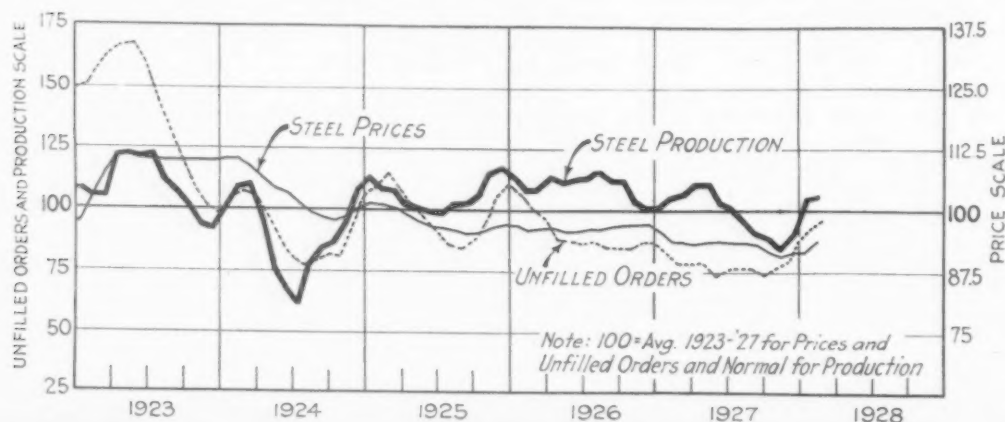
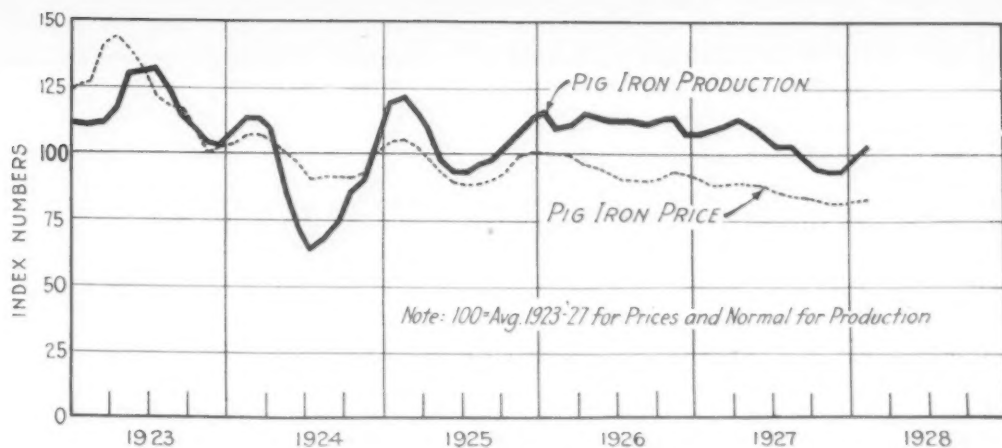


Fig. 1—All Three Curves Point Upward. Finished steel prices advanced well in February; production increased moderately; unfilled orders were higher. But their rounding off tendency is disappointing

Fig. 2—Output of Pig Iron Is Well in Line With Steel. But weakness in fuel and scrap prices may retard pig iron price recovery



This, together with the flattening of the production curve (see Fig. 1), indicates that the recent spurt may not carry through very far, perhaps not even to the middle of the year.

Pig Iron Output in Line with Steel

Pig iron production in February (average daily rate), was 103.8 per cent of our estimate of normal. Thus pig iron production is not so much above normal as is steel production. The February average compares with 99.7 in January and with 110.1 a year ago. It is not only not so far above normal as is steel production, but it is considerably below the level of a year ago, while steel production is about the same as then. In short, pig iron production seems very reasonable in comparison with the steel output, and if all pig iron were consumed in making steel this commodity would be in a strong position market-wise.

That such is not the case, however, one may infer from the fact that pig iron prices advanced less than steel prices in February. At an average of \$17.73 for the month we get a pig iron price index which is only 82.9 per cent of the average during the last five years. This is but little above the January average of 82.5 and compares with 88.8 a year ago. Meanwhile, finished steel prices averaged 93.5 per cent of the five-year average. Furthermore, though pig iron production is still relatively low in comparison with the ingot output, it increased much more rapidly in February than was the case with steel, as a comparison of the first two charts will show. If March is to see a similar relative trend we will find pig iron production again too high in comparison with steel production.

The net conclusion from the available statistics (which are now all too few) is that the position of pig iron is still moderately favorable, but that it is somewhat less so than seemed true a month ago. In view of the weakness in the prices of fuel and steel scrap, it now seems probable that the most that can be expected of the pig iron market during the near future is stability. The slightly recessionary trend in the general level of commodity prices, and the inability of steel prices to advance further, support this conclusion.

In short, while our usual pig iron barometers do not indicate a decline in the price of that commodity, the general situation does not indicate a rise.

Commodity Prices on Down-Grade

ONE of the least encouraging features of the general price situation in the steel industry is the fact that the level of commodity prices declined in February and continued irregular in March. As the third chart shows, there is a broad general relationship between finished steel prices and the general trend of commodity price averages. The Bradstreet price index and THE IRON AGE composite index of finished steel prices have held surprisingly similar levels during the last decade, the two curves crossing and recrossing. Frequently turns in the general price level anticipate similar turns in finished steel prices by 4 to 6 months.

For at least two months now, the Bradstreet index has sagged, while steel prices have edged a little higher, so that the two are at about par, judged by their average relationship. Perhaps the present situation most closely resembles that found at the end of 1925, when steel prices, after a small rise, sagged slightly and then stabilized.

Be that as it may, the fact is now apparent that price advances during the last month or two are not yet well established, and that the volume of business offered is not sufficient to allow all producers to operate at as high a rate as they desire. Signs of price competition are not lacking. The advance in finished steel prices is not backed by advances in semi-finished steel or pig iron, and under such circumstances it is likely to be short-lived.

Finished steel prices are not high. In fact, such advances as have occurred fail to bring the price of sheets, nails or bars up to a point that gives a normal spread over billets. But independent sheet makers find their shipments running behind production, and distributors of nails are amply stocked.

The steel scrap price situation is not encouraging; the declining rate of increase in the unfilled orders of the Steel Corporation and the continued evidence of large supplies of old material indicate further weakness.

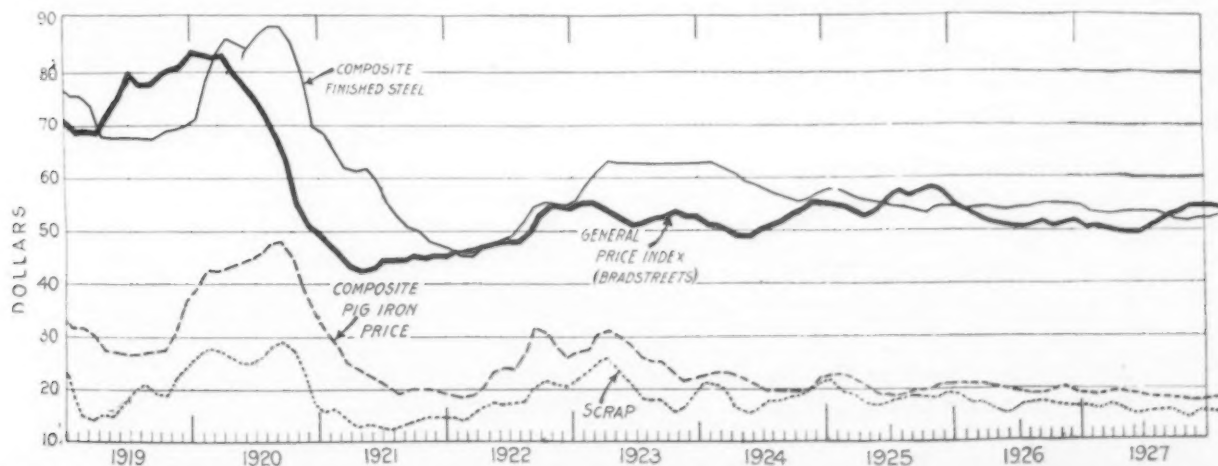


Fig. 3—Commodity Prices Have Been Sagging Slowly. Finished steel price advances are not yet well established. Pig iron prices may be unable to move upward so long as fuels and scrap remain low

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This Issue in Brief

Elapsed time on each job is signaled from various stations throughout the shop to a central recording station. The signaling device operates like the dial on an automatic telephone. Thus, only one recording system is needed for the entire plant, and the time-cards receive only one handling.—Page 809.

Slight rise in wholesale prices. Average commodity price was 96.4 in February, 96.3 in January, and 95.9 in February, 1927.—Page 841.

President takes charge of selling, with eminently successful results. He cuts selling expense and increases sales, finding that things move faster and more productively when salesmen and customers learn that the head of the business is at the sales helm.—Page 797.

Saves 11 per cent of steel by welding structural steel building. New factory structure, arc welded, weighs 989 tons. If riveted, the weight would have been 1114 tons.—Page 804.

Encouraging picture of business conditions is presented by upward trend of steel output, unfilled orders and prices, Dr. Haney indicates. Unfilled tonnage is nearly up to average for past five years.—Page 810.

Earnings of steel industry dropped sharply in 1927. In each case 20 of the leading producers earned less than in 1926. Average per cent of earnings to stockholders' value was 5.1 per cent.—Page 845.

One man does the work of five in plant making automobile car frames automatically. With a force of 200 men, 7000 frames are produced per day. The plant is practically wholly automatic, and is virtually a huge machine.—Page 794

Too little thinking at the top is oftentimes the cause of declining profits. "Too many men are cleaning up their desks every day and doing a clerk's work," says manufacturer. He recommends that they concern themselves more with the operations of each department.—Page 798.

Close spacing of stands conserves heat in new continuous sheet-bar mill. The center to center distance between the 10 stands is only 10 or 12 ft., permitting the bars to reach the finishing stands hot enough to be worked properly.—Page 800

Steel chaplets are safer than iron chaplets, says foundrymen. for the former can be much smaller without fusing when the metal is poured around them.—Page 841.

Imperfect steel is automatically rejected by special inspecting machine. Strip steel is measured for length, width, thickness and curvature. Rejections are automatically thrown out into separate piles.—Page 795.

Blast furnace produces 1500 to 1800 tons of iron per day. German furnace, with 17,000 cu ft. capacity, owes its high output partially to composite character of burden. In one plant 32 different iron-bearing materials are used.—Page 803.

"Too many manufacturers are afraid to take hold of the business themselves." In many firms too much authority has been delegated, says manufacturer, evils creeping in which would be avoided were the head of the business in closer contact.—Page 798

Better make the casting so that defects will occur where they can be seen, and repaired, rather than hide them and run the danger of failure in service. Buyers are often at fault in demanding that the machined surfaces be free of defects, for this forces the foundryman to cast so that the flaws will be hidden.—Page 792

Will pig iron prices advance or decline? In view of weakness in prices of fuel and steel scrap, it now seems probable, says Dr. Haney, that the most that can be expected of the pig iron market during the near future is stability.—Page 811

Tests of truss welds made by five different welders reveal a 22 per cent variation in strength. "Variations are no greater than exist in concrete tests, or in riveted-joint tests," says consulting engineer.—Page 805

Maintenance of an adequate munitions industry would be endangered by passage of bill prohibiting export of munitions, says Secretary of War. In emergency, the Government would be handicapped were industry totally unequipped for munitions manufacture.—Page 846.

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THE IRON AGE

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Gray Iron Foundrymen Moving

CONFRONTED for some time with unsatisfactory business conditions, gray iron foundrymen have finally gathered in consultation and the first steps have been taken in a movement which may be of great benefit to the industry. Last week at Pittsburgh representative foundrymen from many parts of the country, after an all-day session, initiated the American Gray Iron Institute, as told in THE IRON AGE of March 15.

Complaints of the quality of gray iron castings, with special reference to the pig iron used, have been rife for several years. The subject has been much discussed and some progress has been made by cooperation between the American Foundrymen's Association and other societies. But more serious conditions have developed in respect to marketing. According to a leading foundryman who presented his views at Pittsburgh, "not only are there over-production facilities, hand-to-mouth buying and competition from users of castings who have added foundry departments and who are now seeking orders in an endeavor to keep these departments going," but gray iron foundries "are finding competition from other branches of the foundry industry, and there is also creeping in competition from other industries which have begun to make inroads on the gray iron business."

Just what the necessary steps are to meet these unfavorable conditions agreement is not unanimous. Research to improve the product and intensive effort for the development of new uses as well as for strengthening the hold on present markets are obviously good suggestions. Cooperation for stabilizing the gray iron castings market should be gone into seriously. A curb must be put on the practice of supplementing orders that yield a profit by business taken at cut prices and serving only to make a small contribution to overhead. By cooperative organization the copper industry has been stabilized and put upon a sound basis in recent years. Likewise, the steel castings and malleable castings indus-

tries have profited by association effort. While its wide extent and the diversity of conditions make the problem of the gray iron castings industry especially complicated and difficult, the formation of the American Gray Iron Institute should not be without important results. Certainly it has not come upon the scene before its time.

Usury in Instalment Financing

VARIOUS methods are resorted to by "acceptance corporations," or companies financing instalment purchases, to conceal the usurious interest charged for the accommodation. Professor Seligman, in his monograph on "The Economics of Instalment Selling," holds some of them up for condemnation. One way is to charge interest on the cash price of the article, even though one-third may be paid down on the purchase. Thus, if an oil burner is sold for 5 per cent over cash price when the buyer elects to pay one-third down and the balance in ten monthly payments, the buyer is actually charged at the rate of nearly 17 per cent per annum on the continually decreasing loan outstanding.

Another method is to conceal the insurance charge. On an automobile this is higher than on other commodities, due to the added risk that the car may be destroyed by wreck or lost by unlawful conversion. To protect themselves, finance companies insure the car in their favor for the outstanding loan (ordinarily two-thirds of the purchase price) despite the fact that the balance due is continually decreasing, and the insurance companies would put up a vigorous fight before they would pay two-thirds the purchase price to the owner for his lost car.

The most common method of disguising the finance charge is to quote it as an interest payment on the unpaid balance. Suppose 10 per cent of the unpaid balance on an automatic refrigerator is charged, and the note is liquidated in 12 monthly instalments. Of course, that is the equivalent of treating about one-half the full sum as outstanding for the entire period. Mathematically it

would amount to ten times 1.85 or 18½ per cent per annum.

Professor Seligman quotes some "actual examples picked at random from the published rates" and finds that the finance charges on automobiles figure to the following annual rates on the unpaid balances: (a) 26.7 per cent; (b) 27.9 per cent; (c) 38.15 per cent; (d) 13.9 per cent. Details for the last are as follows:

Cash delivered price.....	\$1,500.00
Insurance	13.20
Finance charge	70.80
<hr/>	
Total cost to buyer, if cash.....	\$1,584.00
Down payment	564.00
<hr/>	
Deferred balance.....	\$1,020.00
Cost of financing.....	70.80
<hr/>	
Unpaid balance on car.....	\$949.20

\$70.80 charged for \$949.20 to be paid in 12 monthly instalments is at an annual rate of 13.9 per cent.

These figures represent the approximate rates now charged by the reputable companies operating in the Metropolitan district, and, according to the annual report of General Motors Acceptance Corporation, issued last week, are about what this organization is doing. Quoting from this report, during last year 824,190 accounts were liquidated in full. The total volume of business was \$842,819,877, which indicates that the average acceptance was for about \$1,025. Net profit was \$8,578,475, or about \$10.50 per account, and is equivalent to 19.04 per cent earned on capital funds. Other computations show that more than three-quarters of the financing was evidently done with cheap money from banks.

This indicates that an organization, whose assets rest directly upon the honesty of the individual customer, conservatively managed and taking carefully selected risks, is able to earn a handsome profit even when charging the lowest rates. Further proof is not needed that those financing charges, running from 20 to 84.5 per cent (cited by Professor Seligman), are usurious and unjustifiable. Economic disaster must overtake a man who is so improvident and so poor a risk that these high rates are necessary to cover losses in expensive collections and unpaid accounts.

A NOTABLE tribute to mechanical engineering design and an example of the courage of American industry is the great aggregation of machinery at Milwaukee for making automatically the chassis frames of automobiles. Some of the features are described elsewhere in this issue, but until fuller particulars become available it will be difficult to convey an adequate idea of the unusual and ingenious character of the mechanisms or of the immense investment involved in such trail-blazing engineering. Imagine several parallel conveying systems carrying lengths of strip steel step by step from one end of a truly large building to cross conveyors at the other end, where parts are assembled into complete frames; remember that this great mass of machinery and metal reciprocates in unison and that not only is it stopped and started as one huge machine but stopped so the parts in process are accurately spotted for a definite operation at each station; realize that at every station

is special apparatus to form, to drill holes, to apply a part, to do some riveting, and that manufacturing is thus automatic and men are observers rather than workers; be reminded that the whole affair operates at high speed, as it completes six frames a minute, and that it is adaptable for frames of various sizes and forms of chassis—thus can one appreciate that the Milwaukee development is veritably in a class by itself. It is automatic mass production at high potential—a result of the large volumes peculiar to the automobile industry and of the judgment, which proved well founded, that one company could become the source of supply of a part for many makes of automobiles.

Progress in Using Coal and Steel

WORLD coal production has increased by a trifle less than 10 per cent in 14 years. Obviously that is much less than the gain in the results obtained from coal, for the world is doing a great deal more work and using a great deal more power.

The matter comes up at the moment through the issuance by the Bureau of Mines of its annual report of coal production, covering the year 1927. The figures are in metric tons of 2204.6 lb. For the two pre-war years and the last three years the Bureau of Mines figures are as follows:

<i>World's Production of Coal, Including Anthracite and Lignite</i>		Metric Tons
1912	1,249,000,000	
1913	1,342,000,000	
1925	1,372,000,000	
1926	1,365,000,000	
1927	1,475,000,000	

From 1925 to 1926 British coal production dropped by 118,773,919 metric tons and with a drop of only 7,000,000 tons in the world total it is reasonable to conclude that consumption increased at the expense of stocks, replenished in 1927. Accordingly, a comparison between the mean of 1912 and 1913 and the mean of 1926 and 1927 fairly represents the real increase in coal consumption in 14 years. This increase as precisely computed was 9.6 per cent.

That the world's activities increased by much more than 10 per cent in the 14 years will readily be granted, which means that ton for ton coal is doing much more good than 14 years ago. A strong hint in that direction is furnished by the fact that in the same time the world's production of steel increased 26 per cent. It is true the world's pig iron production increased by only 7 per cent. The divergence is due partly to the iron casting not having increased as has rolled steel and partly to more scrap being used in making steel. As a measure of industrial activity, after the pig iron or steel has been made, steel is by far the more indicative.

It is a notable fact, as heretofore commented on in these columns, that in the United States much progress has been made in using coal, so that year by year it renders more service. The public utilities averaged 3.2 lb. of coal per kilowatt-hour in 1919 and 1.83 lb. in 1927, representing a saving of 43 per cent in eight years.

While from 1912-3 to 1926-7 the world's coal production increased by 9.6 per cent, United States

production increased 14 per cent and the remainder of the world 7 per cent. We have grown much more than the rest of the world, but it has grown, in service secured, much more than 7 per cent; hence it is evident that it also has developed economies in using coal as we have.

As soon as any statistics are furnished and are studied intelligently, a wish arises for more statistics. It would be interesting to know from year to year what good is got out of this coal production. The same is true of steel. Quality and therefore service per ton has greatly increased, and one would like to have a measure of that increasing service. The railroads give us their statistics, vertically downward. Of locomotives the number is given, then the miles of service and the weight of trains drawn. Ton for ton steel is doing much more good than before the war, but we have no precise measures of the progress.

Structural Steel Lettings Heavy

FABRICATED structural steel lettings in January and February as given in Department of Commerce reports totaled 480,000 net tons, against 439,000 tons in 1927 and 418,000 tons in 1926. With a gain of 10 per cent over a year ago and 15 per cent gain over two years ago 1928 has started out very well. Of course, there is no precise augury in these figures for the whole year, for the incidence of a few large jobs in a given short period may make quite a difference. That a steady and large trade is to be expected on general principles, how-

ever, is indicated by the remarkable record of the past three years, which with all their apparent variations from time to time came out just about the same, no one of the three years varying more than 3 per cent from the average.

The increasing fullness of the weekly data of THE IRON AGE on structural steel lettings is shown by comparison of our reports for the first nine weeks with the January and February statements of the Department of Commerce. For 1926 our tonnage was 63 per cent of the department's announced total; for 1927 the proportion was 82 per cent and for this year it was 81 per cent, our nine-weeks totals being: 1926, 262,000 tons; 1927, 353,000 tons; 1928, 390,000 tons. For last year and this our totals were substantially the same as the actual tonnages reported to the Department of Commerce, the department prorating for fabricating shop capacity not reporting. Its reported tonnage was 81 per cent of the computed total for January and February, 1926, 82 per cent for 1927 and 79 per cent for this year. Thus the department is not receiving fuller reports than two years ago, while those of THE IRON AGE are fuller.

Recently there was a little talk that an unusual amount of structural business might have been forced to closing by prospective price advances on plain material, but it is now steel market information that for some time to come steel will be available at such cost as to prevent any hesitancy in construction, while it does not appear that any of the recent business was forced. The tonnage record to date, therefore, stands as a favorable augury for structural steel work in general.

CORRESPONDENCE

Knowing "Why" in Drafting

To the Editor: In the machine shop it is not necessary for the operator on an automatic to be capable of building such a machine in full, but he ought to have a sufficient understanding of its functioning to set it up or to meet an emergency jam or break. The handbook is the automatic screw machine of the drafting room, and its value cannot be overestimated.

But like the machine operator, the draftsman should understand something of the basic facts from which the formulæ and tables are derived. In hiring draftsmen it is often found that the simplest fundamental question about tension, shear or bearing throws them into a panic. They reply that they could answer the question if they had a "Machinery" or "Kent." Provided with it, they nervously fumble through the pages seeking a formula. Finally they apologetically admit they guess they are a little rusty, and at the same time they probably feel the old handbook has fallen down on them in their time of greatest need.

Yet, a few leading questions, adroitly put, soon bring out the fact that back in their minds, suffering from disuse, is at least some knowledge of the "reason why" on which the handbook is based. It is really unfortunate that the mechanical perfection of the handbook has advanced to such a state that draftsmen erroneously believe that it removes the necessity for thinking. The handbook performs many services for draftsmen, but it does not think. Any draftsman using certain sections of the handbook frequently should make it his business to find out why and how a certain for-

mula or table is evolved and used, so that he can be full master of it in applying it.

Similarly a slide rule becomes a mere mechanical adjunct, and the draftsman loses all knowledge of how to perform his mathematical operations without it. Yet the easiest way to explain its use to a novice is to tell him how it functions by adding logarithms to multiply, subtracting them to divide, etc. But it is really good mental exercise to forget the slide rule once in a while and figure things out by long hand or with logarithm tables. In fact, one university regards this idea so highly that it prohibits the use of the slide rule by senior students. We should use these various mechanical helps to aid us, but we should never permit them to master us through losing our greatest asset—our ability to think.

WILLIAM T. VAN HORN.

Oaklyn. N. J.

Eastern Scrap Iron Association Elects Officers

The recently formed Eastern Scrap Iron Association, at a meeting March 15 at the Hotel Astor, New York, elected the following officers: President, Joseph J. Hitner, Henry A. Hitner's Sons Co., Philadelphia; first vice-president, J. V. Bishop, Bishop & Co., Philadelphia; second vice-president, David Straus, Continental Iron & Steel Co., New York; third vice-president, Ben Cohen, L. Cohen & Son, Wilkes-Barre, Pa.; fourth vice-president, S. Dreifus, S. Snyder Corporation, Rochester; fifth vice-president, David Pollock, Mayer, Pollock, Inc., Pottstown, Pa.; secretary, H. Moskowitz, M. Samuel & Sons, Inc., New York; treasurer, Thomas F. Kelly, Brooklyn.

The association, which will include in its membership brokers and dealers in iron and steel scrap in Boston, New York, Philadelphia and other cities of the East, will hold meetings once a month.

Upholds Joint Barge-and-Rail Rates for Warrior River Line

WASHINGTON, March 20.—Refusal of the Southern Railway System to join the Inland Waterways Corporation, operating the Mississippi-Warrior River service under the jurisdiction of the War Department, in certain barge-and-rail and rail-and-barge rates was held to be unreasonable but not unduly prejudicial by Paul Coyle, examiner of the Interstate Commerce Commission, in a report made public last Friday. The water line asked for joint and differential class and commodity rates from New Orleans, and Mobile, Ala., to certain points on the Southern lines in Alabama, Georgia and Tennessee and to all points on the Southern lines in North Carolina, South Carolina and Virginia in both directions. The rates would apply to shipments which are not accorded free storage-in-transit at Birmingham, Ala.

The examiner held that joint rates should be established which are the same as contemporaneous all-rail rates, less differentials of 20 per cent of the all-rail rate between Birmingham, on the one hand, and New Orleans and Mobile, on the other. Wherever rates are established from and to New Orleans, the report said, they should also be established from and to Mobile. In establishing the rates from or to intermediate points, it was held, they should not exceed the rates from or to more distant points. The complainants had sought differentials of 7.5c. per 100 lb. under the all-rail rates on iron and steel products northbound from New Orleans and 7c. northbound from Mobile and 7c. and 5.5c. respectively southbound to New Orleans and Mobile. On steel rails the water line sought differentials of 5c. and 4.5c. respectively southbound to New Orleans and Mobile, and on cast iron pipe it asked for differentials of 11c. and 5c. respectively on southbound traffic to New Orleans and Mobile. These differentials are 20 per cent of the all-rail rates from New Orleans and Mobile to Birmingham and in the reverse direction.

Unemployment Situation to Be Reported on by Labor Department

WASHINGTON, March 20.—The Department of Labor is about to make a report on a labor survey and has already made it known that the unemployment situation, while having a serious aspect, has been greatly overstated. As a matter of fact it has been indicated that unemployment is probably not greatly in excess of the usual idleness throughout the country and is roughly estimated at 1,000,000 workers. Some of the reports have placed the estimate of unemployment as high as 4,000,000. The Department of Labor notified President Coolidge that employment in February showed an increase of 1.5 per cent over February of last year and that the volume of wages paid during February of the current year exceed that of the same month last year by 4 per cent.

Secretary of Labor Davis has stated that the unemployment situation is not so alarming as "interested parties endeavor to make it," but has conceded that it is sufficiently large to give serious thought. Conviction has been expressed by him, however, that with the advancing season much of the present unemployment will disappear of its own accord. Farm labor is opening up, the Government and private enterprises have elaborate building programs and the improvement in the steel industry indicates a general improvement due in industry, he stated.

The broad economic inquiry instituted by the Bureau of Economic Research of New York recently got under way. It likely will take the committee, appointed by Secretary of Commerce Hoover, one year before it makes its report. The scope of the inquiry is extremely broad. It will deal with shifts in employment, changes in methods of production in industry and agriculture, shifts in price levels and profits, movements in the business cycle, shifts in standards of living, foreign trade and foreign credits and other allied subjects which bear upon an understanding of the general business situation of the country.

Ask Modification of Wrought Washer Case Decision

WASHINGTON, March 20.—Modification of the order of the Interstate Commerce Commission in the case of the Wrought Washer Mfg. Co., Milwaukee, in which the commission listed items as scrap which should take the billet rather than the finished product rate is sought in a petition filed yesterday by the Baltimore & Ohio Railroad and other carriers which seek a supplemental hearing in the proceedings. Subsequent to the decision the carriers successfully petitioned the commission to postpone for 90 days the effective date of March 21.

It is contended by the railroads that the finding as to skelp, the defining of the minimum length of strip steel as 10 ft., the inclusion in the order of waster sheets and the definition of crop ends are erroneous. The railroads declare their readiness to introduce evidence to the effect that strip steel is salable and is being regularly sold as such in various lengths under 10 ft. and that skelp is sold in competition with strip steel. These items, together with waster sheets, which are held to constitute prime material, the petition says, should be omitted from the order. It is maintained there is no well recognized distinction between waster sheets and prime material and that waster sheets are being used as substitute for prime material. A definition of crop ends is asked that will cover only such material as comes within the intent of the order. The language of the order would defeat its purpose, the carriers say. To indicate the far-reaching effect the order would have the railroads mention a list of steel producers and consumers in various sections of the country who are seeking billet rates or less on the basis of the decision in the Wrought Washer case.

Larger Total of Orders for Fabricated Steel Plate

WASHINGTON, March 20.—Making a gain of 13,801 tons, orders for fabricated steel plate in February totaled 49,588 tons, or 62.1 per cent of capacity, according to reports received by the Department of Commerce from 51 concerns. This compares with 35,787 tons, or 44.8 per cent of capacity, in January.

Bookings for oil storage tanks amounted to 25,532 tons, as against 11,101 tons in January; refinery materials and equipment, 4454 tons, as compared with 2575 tons; tank cars, 592 tons, as against 2412 tons; gas holders, 3679 tons, as compared with 2062 tons; blast furnaces, 143 tons, as against 1225 tons; and stacks and miscellaneous, 15,188 tons, as compared with 16,412 tons.

Truscon Steel Co. Only Bidder on Hydraulic Steel Property

A bid of \$1,000,000 cash for the plant and assets of the Hydraulic Steel Co., Cleveland, was made by the Truscon Steel Co., Youngstown, March 14, the date set for taking bids for the property. The Youngstown company was the only bidder. The bid is based on the Hydraulic company's balance sheet as of Oct. 31, 1927. The Hydraulic Steel Co. has been operated by Thomas P. Goodbody, receiver, since 1923. It is understood that if the sale is confirmed, as is expected, the Truscon company will spend considerable money in remodeling

Railroad and Water Freight Service for Upper Mississippi

Announcement has been made by the War Department that a four-day rail and water freight service between Chicago, St. Paul and Minneapolis will be put into effect April 2, with a saving in cost of approximately 15 per cent as against the all-rail rate. The service will make use of the upper Mississippi division of the Mississippi Barge Line, with sailings from St. Louis for St. Paul and Minneapolis on Mondays and Thursdays. Barges will leave Dubuque, Iowa, on Tuesdays and Saturdays, making the trip in three days.

Iron and Steel Markets

Large April Output Assured

Heavy Steel Specifications on Expiring First Quarter

Contracts—Tin Plate Demand Improves—Possible

Advance in Pipe—Pig Iron Melt Gains

STEEL production, in contrast with an uneven and not entirely reassuring general business situation, is holding its own and in some districts is making further gains. Steel ingot output for the first quarter now promises to exceed that of the same period of 1927, possibly by several hundred thousand tons. There are no signs of any distinct let-up in production in April. The way business is coming in, mill operations are likely to continue at substantially the pace of March instead of declining as in April last year.

Steel Corporation plants continue to operate at 90 per cent of capacity. Bethlehem operations early in the month were at 75 per cent and for the month up to this time averaged 81 per cent. Among important producing districts, Chicago is still running at 95 per cent, while the Greater Pittsburgh area, including the Youngstown district, is showing a gain over the 80 per cent rate that prevailed last month.

Expanding building operations, increasing automobile production, large backlogs in rails and track supplies, sustained activity among farm implement plants and prospects for heavier tin plate consumption are favorable market factors.

High output in the automobile industry throughout the second quarter is now regarded as assured, but motor car builders are showing hesitancy in placing second quarter contracts. Steel rail producers have had a good operation since Jan. 1, and most of them have sufficient bookings to keep going at an equal rate up to the middle of June. Chicago mills took orders for 8000 tons additional during the week, and there is still some rail business to be placed in the South, Southwest and Far West. The Western Pacific is inquiring for 10,000 tons. The increasing use of track supplies was reflected in orders taken in the past winter, which were 20 per cent heavier than a year ago.

Prospects for a larger pack of canned goods than in 1927 are indicated by heavier specifications for tin plate. Mill operations have increased to 85 per cent of capacity, as against a recent rate of 80 per cent. Both producers and consumers of tin plate are concerned over the price of pig tin, which has advanced from a low of 50c. to 52c. per lb., New York, on heavy sales, totaling 3000 tons for the week. Little spot tin is now available, and metal for nearby delivery is commanding a premium.

Merchant pipe production is commencing to improve under the stimulus of increasing building activity, although pipe mill operations in the Youngstown district are still at a 60 per cent rate. A possible price advance—about 5 per cent—effective early in April, is having consideration in the merchant pipe trade. In the line pipe field, seam-

less pipe is competing with lapweld pipe in a large way. An order for 200 miles of 8-in. seamless pipe, totaling 13,000 tons, has been placed by the Standard Oil Co. of California for a line from Pecos County, Tex., to El Paso.

Buyers, as a rule, are not hastening to contract for second quarter, believing that the upward movement of prices has reached its peak. On the other hand, the mills, not wishing to discourage the flow of tonnage supporting the current high rate of operations, are accepting heavy specifications on expiring first quarter contracts. In plates, shapes and bars, for instance, shipments of material invoiced at 1.80c. will probably extend through April, deferring a real test of the second quarter contract price of 1.85c. until May.

Recently revised prices on alloy steel bars will not apply to contract consumers until after April 1. While there were some reductions, four grades of alloy steel comprising over 90 per cent of the tonnage used were advanced \$2 to \$4 a ton.

Irregularities in prices of wire nails and plain wire, although not general, are more numerous.

Structural steel awards of nearly 33,000 tons include 10,000 tons for subway work in New York and 7600 tons for a manufacturing plant at Cumberland, Md. Bids are being taken on 7700 tons of subway work in New York, a bridge approach in St. Louis calling for 6000 tons and an aqueduct at Oakland, Cal., requiring 4830 tons. The total of fresh structural projects is more than 34,000 tons.

February orders for fabricated structural steel are computed at 270,000 tons, the highest figure since last October and the sixth highest in the history of the industry.

Pig iron shows its greatest strength in the Chicago district, where sales for second quarter are much heavier than for the first quarter. In the Central West, shipments of iron to foundries are showing gains, and to some extent this is also true of other sections. With sales of 10,000 tons, of which half was in one lot, the Pittsburgh market was lifted out of a lethargy of many weeks. In New England, sales of Buffalo iron have been made at a new low level.

Steel scrap shows no marked strength, but it is slightly firmer at Pittsburgh while weaker at Chicago. Sales of compressed sheets were made to a Pittsburgh district consumer at \$15, an advance of \$1 a ton, and heavy melting steel is quotable there at \$14.50 to \$15.50, a slight rise.

For the sixth successive week THE IRON AGE composite prices remain at the same levels, that for pig iron at \$17.75 a ton, while that for finished steel is at 2.364c. a lb.

A Comparison of Prices

Advances Over the Previous Week in Heavy Type, Declines in Italics

At Date, One Week, One Month, and One Year Previous

Pig Iron, Per Gross Ton:	Mar. 20, 1928	Mar. 13, 1928	Feb. 21, 1928	Mar. 22, 1927
No. 2 fdy., Philadelphia...	\$20.76	\$20.76	\$20.76	\$21.76
No. 2, Valley furnace...	17.25	17.25	17.25	18.50
No. 2, Southern, Cin'ti...	19.69	19.69	19.69	21.69
No. 2, Birmingham...	16.00	16.00	16.00	18.00
No. 2 foundry, Chicago*	18.50	18.50	18.50	20.00
Basic, del'd eastern Pa...	19.50	19.50	19.50	20.75
Basic, Valley furnace...	17.00	17.00	17.00	18.50
Valley Bessemer, del. P'gh	19.26	19.26	19.26	21.26
Malleable, Chicago*	18.50	18.50	18.50	20.00
Malleable, Valley...	17.25	17.25	17.25	18.50
Gray forge, Pittsburgh...	18.51	18.51	18.51	19.76
L. S. charcoal, Chicago...	27.04	27.04	27.04	27.04
Ferromanganese, furnace...	100.00	100.00	100.00	100.00

Rails, Billets, etc., Per Gross Ton:	Mar. 20, 1928	Mar. 13, 1928	Feb. 21, 1928	Mar. 22, 1927
O.-h. rails, heavy, at mill.	\$43.00	\$43.00	\$43.00	\$43.00
Light rails at mill...	36.00	36.00	36.00	36.00
Bess. billets, Pittsburgh...	33.00	33.00	33.00	34.00
O.-h. billets, Pittsburgh...	33.00	33.00	33.00	34.00
O.-h. sheet bars, P'gh...	34.00	34.00	34.00	34.00
Forging billets, P'gh...	38.00	38.00	38.00	40.00
O.-h. billets, Phila...	38.30	38.30	38.30	39.30
Wire rods, Pittsburgh...	44.00	44.00	44.00	43.00
	Cents	Cents	Cents	Cents
Skelp, grvd. steel, P'gh, lb.	1.85	1.85	1.85	1.90

Finished Iron and Steel,	Per Lb. to Large Buyers:	Cents	Cents	Cents	Cents
Iron bars, Philadelphia...	2.12	2.12	2.12	2.12	
Iron bars, Chicago...	2.00	1.90	1.90	2.00	
Steel bars, Pittsburgh...	1.85	1.85	1.85	1.90	
Steel bars, Chicago...	2.00	1.95	1.95	2.00	
Steel bars, New York...	2.19	2.19	2.19	2.24	
Tank plates, Pittsburgh...	1.85	1.85	1.85	1.85	
Tank plates, Chicago...	2.00	1.95	1.95	2.00	
Tank plates, New York...	2.17½	2.17½	2.17½	2.19	
Beams, Pittsburgh...	1.85	1.85	1.85	1.90	
Beams, Chicago...	2.00	1.95	1.95	2.00	
Beams, New York...	2.14½	2.14½	2.14½	2.19	
Steel hoops, Pittsburgh...	2.20	2.20	2.20	2.30	

*The average switching charge for delivery to foundries in the Chicago district is 61c. per ton.

On export business there are frequent variations from the above prices. Also, in domestic business, there is at times a range of prices on various products, as shown in our market reports on other pages.

Sheets, Nails and Wire,	Mar. 20, 1928	Mar. 13, 1928	Feb. 21, 1928	Mar. 22, 1927
Per Lb. to Large Buyers:	Cents	Cents	Cents	Cents
Sheets, black, No. 24, P'gh	2.90	2.90	2.90	2.75
Sheets, black, No. 24, Chi-				
cago dist. mill...	3.00	3.00	3.00	2.95
Sheets, galv., No. 24, P'gh	3.65	3.65	3.65	3.65
Sheets, galv., No. 24, Chi-				
cago dist. mill...	3.85	3.85	3.85	3.85
Sheets, blue, 9 & 10, P'gh...	2.10	2.10	2.10	2.20
Sheets, blue, 9 & 10, Chi-				
cago dist. mill...	2.20	2.20	2.20	2.35
Wire nails, Pittsburgh...	2.65	2.65	2.65	2.55
Wire nails, Chicago dist.				
mill...	2.70	2.70	2.70	2.60
Plain wire, Pittsburgh...	2.50	2.50	2.50	2.40
Plain wire, Chicago dist.				
mill...	2.55	2.55	2.55	2.45
Barbed wire, galv., P'gh...	3.35	3.35	3.35	3.25
Barbed wire, galv., Chi-				
cago dist. mill...	3.40	3.40	3.40	3.30
Tin plate, 100 lb. box, P'gh	\$5.25	\$5.25	\$5.25	\$5.50

Old Material, Per Gross Ton:	Mar. 20, 1928	Mar. 13, 1928	Feb. 21, 1928	Mar. 22, 1927
Heavy melting steel, P'gh...	\$14.75	\$14.75	\$15.00	\$16.75
Heavy melting steel, Phila...	13.50	13.50	13.50	14.50
Heavy melting steel, Ch'go	12.50	12.75	13.00	13.00
Carwheels, Chicago...	14.00	14.00	14.00	15.00
Carwheels, Philadelphia...	15.50	15.50	15.50	16.00
No. 1 cast, Pittsburgh...	14.50	14.50	14.50	16.00
No. 1 cast, Philadelphia...	16.00	16.00	16.00	17.00
No. 1 cast, Ch'go (net ton)	14.50	14.50	14.50	16.50
No. 1 RR. wrot. Phila...	15.00	15.00	15.00	17.00
No. 1 RR. wrot. Ch'go (net)	11.00	11.00	11.50	12.00

Coke, Connellsville, Per Net Ton at Oven:	Mar. 20, 1928	Mar. 13, 1928	Feb. 21, 1928	Mar. 22, 1927
Furnace coke, prompt...	\$2.60	\$2.60	\$2.75	\$3.25
Foundry coke, prompt...	3.75	3.75	3.75	4.25

Metals,	Per Lb. to Large Buyers:	Cents	Cents	Cents	Cents
Lake copper, New York...	14.25	14.25	14.25	13.50	
Electrolytic copper, refinery	14.00	14.00	13.82½	13.12½	
Zinc, St. Louis...	5.72½	5.65	5.47½	6.65	
Zinc, New York...	6.07½	6.00	5.82½	7.00	
Lead, St. Louis...	5.80	5.82½	6.07½	7.30	
Lead, New York...	6.00	6.00	6.32½	7.65	
Tin (Straits), New York...	52.00	50.12½	51.50	69.25	
Antimony (Asiatic), N. Y.	10.25	10.50	10.87½	13.00	

Pittsburgh

Mills Accumulate Considerable Steel Tonnage—Price Tests Deferred

PITTSBURGH, March 20.—Steel manufacturers have accumulated considerable tonnage this month either by the extension of existing first quarter contracts into the second quarter or by permitting additions to these contracts. Since consumers generally are covered through April and in some cases and in some products for a longer period at first quarter prices, the test of the higher prices which have been announced since the opening of the year, which ordinarily would come in the next week or 10 days, has been deferred at least a month.

By the course they have pursued, steel manufacturers have pretty well assured themselves of a continued good rate of operation in April and, as this month has shown a gain rather than a loss in ingot production in the Greater Pittsburgh area as compared with February, the expectation that the first four months of the year will compare favorably with that period last year is strengthened.

The steel trade has been disappointed in its expectation of railroad business except in rails and track material. The oil industry, which was counted on to provide a large volume of pipe tonnage, has made no definite progress in the correction of the over-supply situation, and while some storage tank business has been placed and more is ahead, there is no thought that this tonnage will equal that ordinarily taken for oil and gas well development. Incidentally, oil production last week increased to 2,400,000 bbl. a day, and

that is well beyond the rate at which it can be consumed.

The total takings of steel by the automotive industry are large and satisfactory, but some motor car builders are operating at a relatively higher rate than others. The agricultural implement industry is doing well, and the only fault that is found with structural steel awards is that the tonnage is mostly in a few large jobs.

Primary materials still are depressed. While there has been a tendency to dissociate the prices of merchant pig iron and those of steel, it is a fairly commonly held idea that the trouble which the manufacturers have encountered in establishing the advances they have proposed this year is partly due to the low prices at which pig iron and other raw materials of steel have been selling. It has been estimated that in this district fully half of the merchant iron that has been marketed in the past few years has been shipped from steel works as distinct from merchant furnaces.

Pig Iron.—In point of tonnage sold, the past week has been the best that local producers have had in some time, but the market has not shown real activity, as half of a total of approximately 10,000 tons in known sales was in one transaction. This lot of 5000 tons was No. 2 foundry sold to a maker of railroad equipment and is for shipment during the next 60 days. The price was \$17.25, Valley furnace. Sale of 1000 tons of No. 1 foundry is reported at \$18.25, Valley furnace, or at the full silicon differential over the base grade. Scattering sales in lots of a carload up to 250 tons of foundry, malleable and Bessemer iron account for the remainder of the week's business. Prices have developed no important change but some irregularity, ascribable chiefly to freight equalization by Valley

furnaces, with more favorably located producers, still is noted. Sales of Bessemer iron at \$17.25, Valley furnace, are more representative of equalizing competitive freight rates than of an actual reduction of the price at Valley furnaces. The movement of iron against old orders still is good.

Prices per gross ton, f.o.b. Valley furnace:

Basic	\$17.00
Bessemer	17.50
Gray forge	16.75
No. 2 foundry	17.25
No. 3 foundry	16.75
Malleable	17.25
Low phosphorus, copper free	27.00

Freight rate to the Pittsburgh or Cleveland district, \$1.76.

Ferroalloys.—Sustained high rate of steel ingot production accounts for free specifying against contracts for the commonly used alloys, but there is very little new business. Prices are unchanged.

Semi-Finished Steel.—Open market activity in the various forms of crude steel is limited. Strip, sheet and tin plate makers who depend upon others for their steel are having a good operation, but are covered by requirement contracts and are drawing against them instead of broadcasting their inquiries. There is not enough activity in pipe to create much demand for skelp. While specifications on old and lower-priced wire rod contracts are fairly good, consumers are slow to contract for second quarter requirements at the present prices, since secondary manufacturers have not found it possible to advance prices of their products.

Bars, Plates and Shapes.—Buyers are showing less anxiety in getting their orders on mill books than in the first two months of the year, when they were covering against price advances. Bars are still moving well on old orders generally carrying 1.80c., base Pittsburgh, but many buyers still have enough coverage to take them into the second quarter and it will be May before some are called upon to specify against second quarter contracts recently written at 1.85c. The same conditions rule in plates and shapes. Some small tonnages of these products command 1.90c., Pittsburgh, but in a general way 1.85c. is not often exceeded.

Rails and Track Supplies.—Standard-section rails are moving steadily on 1928 contracts, but not much new business is developing. In track fastenings, the railroads are specifying steadily against old orders, but new business amounts to little. Light-section rails are slow.

Wire Products.—Prices, which have shown some irregularity without materially affecting the general market quotations, have in the past week or 10 days developed an unevenness that is attracting notice. Some sales of nails are being made at the full price, but concessions which were pretty well confined to a few localities now are developing elsewhere, notably in the East. In plain wire rather strong resistance is developing to the present base of \$2.50 per 100 lb., Pittsburgh, since that represents an advance of \$2 a ton over present invoice prices, which manufacturing consumers have not

found possible to pass along to the secondary products. Nail business is slow because of the heavy deliveries to jobbers since the opening of the year, but there is a fair degree of activity in other products.

Tubular Goods.—Seamless pipe has invaded the line pipe field in a large way. An order for 200 miles of 8-in. pipe recently placed by the Standard Oil Co. of California for a line from Pecos County, Texas, to its refinery at El Paso, with the National Tube Co., calls for seamless pipe, and this is not the first time it has been ordered for that purpose, as part of the most recent pipe line laid by the Roxana Petroleum Co. was seamless. The latest award emphasizes the growing competition that lapweld pipe must face. Except for this business and a fairly steady expansion in the movement into consumption of butt-weld pipe, the general situation is featureless. Oil country demands still are light. Prices are irregular.

Sheets.—There is little complaint as to the volume of specifications on old orders carrying prices lower than now are commonly quoted, but most mills still find limited interest in second quarter tonnages, and while a fair amount of new business is being booked at current prices, it is mostly for early shipment. As the general steel market has halted in its price advances, sheet buyers seem to feel they have nothing to lose by holding off for a while on second quarter commitments. Some producers which lack full rolling mill schedules are disposed to round them out at the expense of prices, but these cases appear to be the extent of the deviations from the regular market quotations. Sheet mill operations average very close to 90 per cent of capacity.

Tin Plate.—There has been a quickening both in specifications and mill operations. The latter have moved up to 86 per cent with the American Sheet & Tin Plate Co. and with independent capacity holding its recent rate, the general average now is not much under 85 per cent, as against 80 per cent, the rate of the past few weeks. Canners are taking a more optimistic view of the season's prospects for perishable foods, and it is now estimated that the requirements will be above the average of the past two years. The market is steady at \$5.25 per base box, Pittsburgh, for standard coke tin plate.

Cold-Finished Steel Bars and Shafting.—The market has lost some of its recent activity. Although there has not been much variation in the rate of specifications on contracts for this quarter, buyers are not rushing to cover for the second quarter. The retreat of producers from 2.30c., base, to 2.20c., probably has created conservatism among buyers.

Hot Rolled Flats.—The market is active, but leaves much to be desired from the price angle and in prospects for the second quarter. Buyers are specifying so freely against low-priced first quarter contracts for April shipment that there is a fear that next month's specifications will be light. While it is not a general condition, there is enough extending of first quarter

THE IRON AGE Composite Prices

Finished Steel
March 20, 1928, 2.364c. a Lb.

One week ago.....	2.364c.
One month ago.....	2.364c.
One year ago.....	2.367c.
10-year pre-war average.....	1.689c.

Based on steel bars, beams, tank plates, plain wire, open-hearth rails, black pipe and black sheets. These products constitute 86 per cent of the United States output of finished steel.

	High		Low	
1928	2.364c.	Feb. 14:	2.314c.	Jan. 3
1927	2.453c.	Jan. 4:	2.293c.	Oct. 25
1926	2.453c.	Jan. 5:	2.403c.	May 18
1925	2.560c.	Jan. 6:	2.396c.	Aug. 18
1924	2.789c.	Jan. 15:	2.460c.	Oct. 14
1923	2.824c.	Apr. 24:	2.446c.	Jan. 2

Pig Iron
March 20, 1928, \$17.75 a Gross Ton

One week ago.....	\$17.75
One month ago.....	17.75
One year ago.....	19.04
10-year pre-war average.....	15.72

Based on average of basic iron at Valley furnace and foundry irons at Chicago, Philadelphia, Buffalo, Valley and Birmingham.

	High		Low	
1928	\$17.75,	Feb. 14:	\$17.54,	Jan. 3
1927	19.71,	Jan. 4:	17.54,	Nov. 1
1926	21.54,	Jan. 5:	19.46,	July 13
1925	22.50,	Jan. 13:	18.96,	July 7
1924	22.88,	Feb. 26:	19.21,	Nov. 3
1923	30.86,	Mar. 20:	20.77,	Nov. 20

Mill Prices of Finished Iron and Steel Products

Iron and Steel Bars

Soft Steel

	Base Per Lb.
F.o.b. Pittsburgh mill.....	1.85c. to 1.90c.
F.o.b. Chicago.....	2.00c.
Del'd Philadelphia.....	2.17c. to 2.22c.
Del'd New York.....	2.19c. to 2.24c.
Del'd Cleveland.....	2.04c. to 2.09c.
F.o.b. Cleveland.....	1.85c. to 1.90c.
F.o.b. Lackawanna.....	1.95c.
F.o.b. Birmingham.....	2.05c. to 2.15c.
C.i.f. Pacific ports.....	2.35c.
F.o.b. San Francisco mills.....	2.35c. to 2.40c.

Billet Steel Reinforcing

F.o.b. Pittsburgh mills.....	1.90c. to 2.00c.
F.o.b. Birmingham.....	2.05c. to 2.15c.

Rail Steel

F.o.b. mills east of Chicago district.....	1.75c.
F.o.b. Chicago Heights mill.....	1.80c. to 1.85c.

Iron

Common iron, f.o.b. Chicago.....	2.00c.
Refined iron, f.o.b. P'gh mills.....	2.75c.
Common iron, del'd Philadelphia.....	2.12c.
Common iron, del'd New York.....	2.14c.

Tank Plates

	Base Per Lb.
F.o.b. Pittsburgh mills.....	1.85c. to 1.90c.
F.o.b. Chicago.....	2.00c.
F.o.b. Birmingham.....	2.05c. to 2.15c.
Del'd Cleveland.....	2.04c. to 2.09c.
Del'd Philadelphia.....	2.10c. to 2.15c.
F.o.b. Coatesville.....	2.00c. to 2.05c.
F.o.b. Sparrows Point.....	2.00c.
F.o.b. Lackawanna.....	1.95c.
Del'd New York.....	2.17½c. to 2.22½c.
C.i.f. Pacific ports.....	2.30c.

Structural Shapes

	Base Per Lb.
F.o.b. Pittsburgh mills.....	1.85c. to 1.90c.
F.o.b. Chicago.....	2.00c.
F.o.b. Birmingham.....	2.05c. to 2.15c.
F.o.b. Lackawanna.....	1.95c.
F.o.b. Bethlehem.....	2.00c.
Del'd Cleveland.....	2.04c. to 2.09c.
Del'd Philadelphia.....	2.12c. to 2.18c.
Del'd New York.....	2.14½c. to 2.19½c.
C.i.f. Pacific ports.....	2.35c.

Hot-Rolled Flats (Hoops, Bands and Strips)

	Base Per Lb.
Narrower than 3 in., P'gh.....	2.20c. to 2.40c.
Wider than 3 in. to 6 in., P'gh.....	2.10c. to 2.20c.
6 in. and wider, P'gh.....	*1.90c. to 2.00c.
Narrower than 3 in., Chicago.....	2.30c. to 2.50c.
From 3 to 6 in., Chicago.....	2.20c. to 2.30c.
6 in. and wider, Chicago.....	2.00c. to 2.10c.

*Mills follow plate or sheet prices according to gage on wider than 12 in.

Cold-Finished Steel

	Base Per Lb.
Bars, f.o.b. Pittsburgh mills.....	2.20c.
Bars, f.o.b. Chicago.....	2.20c.
Bars, Cleveland.....	2.25c.
Shafting, ground, f.o.b. mill.....	*2.45c. to 2.90c.
Strips, under 12 in., 1 up to 3 tons, P'gh.....	3.00c. to 3.15c.
Strips, under 12 in., 1 up to 3 tons, Cleveland.....	3.00c. to 3.15c.
Strips, under 12 in., 1 up to 3 tons, del'd Chicago.....	3.30c. to 3.45c.
Strips, under 12 in., 1 up to 3 tons, Worcester.....	3.25c. to 3.40c.

*According to size.

Wire Products

(To jobbers in car lots, f.o.b. Pittsburgh and Cleveland)

	Base Per Keg
Wire nails.....	\$2.65
Galvanized nails.....	4.65
Galvanized staples.....	3.35
Polished staples.....	3.10
Cement coated nails.....	2.65

	Base Per 100 Lb.
Bright plain wire, No. 9 gage.....	\$2.50
Annealed fence wire.....	2.65
Spring wire.....	3.50
Gal'd wire, No. 9.....	3.10
Barbed wire, gal'd.....	3.35
Barbed wire, painted.....	3.10

Chicago district mill and delivered Chicago prices are \$1 per ton above the foregoing. Birmingham mill prices \$3 a ton higher; Worcester, Mass., (wire) mill \$3 a ton higher on production of that plant; Duluth, Minn., mill \$2 a ton higher; Anderson, Ind., \$1 higher.

Woven Wire Fence

	Base to Retailers Per Net Ton
F.o.b. Pittsburgh.....	\$65.00
F.o.b. Cleveland.....	65.00
F.o.b. Anderson, Ind.....	66.00
F.o.b. Chicago district mills.....	67.00
F.o.b. Duluth.....	68.00
F.o.b. Birmingham.....	68.00

Sheets

Blue Annealed

	Base Per Lb.
Nos. 9 and 10, f.o.b. P'gh—wider than 40 in.....	2.20c.
Nos. 9 and 10, f.o.b. P'gh—40 in. and narrower.....	2.10c.
Nos. 9 and 10, f.o.b. Chicago dist. mill.....	2.20c. to 2.30c.
Nos. 9 and 10, del'd Cleveland.....	2.29c.
Nos. 9 and 10, del'd Philadelphia.....	2.42c. to 2.52c.
Nos. 9 and 10, f.o.b. Birmingham.....	2.25c. to 2.30c.
Box Annealed, One Pass Cold Rolled	
No. 24, f.o.b. Pittsburgh.....	2.90c.
No. 24, f.o.b. Chicago dist. mill.....	3.00c.
No. 24, del'd Cleveland.....	3.09c.
No. 24, del'd Philadelphia.....	3.22c.
No. 24, f.o.b. Birmingham.....	3.05c.

Metal Furniture Sheets

No. 24, f.o.b. Pittsburgh, A grade.....	4.05c.
No. 24, f.o.b. Pittsburgh, B grade.....	3.85c.

Galvanized

No. 24, f.o.b. Pittsburgh.....	3.65c. to 3.75c.
No. 24, f.o.b. Chicago dist. mill.....	3.85c.
No. 24, del'd Cleveland.....	3.84c. to 3.94c.
No. 24, del'd Philadelphia.....	4.07c.
No. 24, f.o.b. Birmingham.....	3.90c.

Tin Mill Black Plate

No. 28, f.o.b. Pittsburgh.....	3.00c.
No. 28, f.o.b. Chicago dist. mill.....	3.10c.

Automobile Body Sheets

No. 20, f.o.b. Pittsburgh.....	4.15c.
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Long Terns

No. 24, 8-lb. coating, f.o.b. mill primes.....	4.10c.
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Tin Plate

	Per Base Box
Standard cokes, f.o.b. P'gh district mills.....	\$5.25
Standard cokes, f.o.b. Gary.....	5.35

Terne Plate

(F.o.b. Morgantown or Pittsburgh)
(Per package, 20 x 28 in.)

8-lb. coating I.C. \$11.20	25-lb. coating I.C. \$16.70
15-lb. coating I.C. 14.90	30-lb. coating I.C. 17.75
20-lb. coating I.C. 15.30	40-lb. coating I.C. 19.85

Alloy Steel Bars

(F.o.b. maker's mill.)

S.A.E. Series Numbers	Per 100 Lb.
2000 (¾% Nickel).....	\$2.90
2100 (1¼% Nickel).....	3.20
2300 (3¼% Nickel).....	4.15
2500 (5% Nickel).....	4.90
3100 Nickel Chromium.....	3.20
3200 Nickel Chromium.....	3.65
3300 Nickel Chromium.....	6.45
3400 Nickel Chromium.....	5.85
4100 Chromium Molybdenum (0.15 to 0.25 Molybdenum).....	3.15
4100 Chromium Molybdenum (0.25 to 0.40 Molybdenum).....	3.35
4600 Nickel Molybdenum (0.20 to 0.30 Molybdenum, 1.25 to 1.75 Nickel).....	3.70
5100 Chromium Steel (0.60 to 0.90 Chrome).....	3.06
5100 Chromium Steel (0.80 to 1.10 Chrome).....	3.10
5100 Chromium Spring Steel.....	2.85
6100 Chromium Vanadium Bars.....	3.85
6100 Chromium Vanadium Spring Steel.....	3.60
9250 Silicon Manganese Spring Steel.....	2.90
Chrome Nickel Vanadium.....	4.15
Carbon Vanadium.....	3.60

Above prices are for hot-rolled steel bars, forging quality. The ordinary differential for cold-drawn bars is 1c. per lb. higher. For billets 4 x 4 to 10 x 10 in., the price for a gross ton is the net price for bars of the same analysis. For billets under 4 x 4 in. down to and including 2½ in. squares, the price is \$5 a gross ton above the 4 x 4 billet price.

Slabs with sectional area of 16 in. or over carry the billet price; slabs with sectional area of 12 in. to 16 in. carry a \$5 extra above the billet price and slabs with a sectional area under 12 in. carry the bar price.

Band sizes are 40c. per 100 lb. higher.

Rails

	Per Gross Ton
Standard, f.o.b. mill.....	\$43.00
Light (from billets), f.o.b. mill.....	36.00
Light (from rail steel), f.o.b. mill.....	34.00
Light (from billets), f.o.b. Ch'go mill.....	36.00

Track Equipment

	Base Per 100 Lb.
Spikes, ½ in. and larger.....	\$2.70 to \$2.80
Spikes, ½ in. and smaller.....	2.70 to 2.80
Spikes, boat and barge.....	2.90 to 3.00
Tie plates, steel.....	2.11
Angle, bars.....	2.70
Track bolts, to steam railroads.....	3.80 to 4.90
Track bolts, to jobbers, all sizes, per 100 count, 70 per cent off list	

Welded Pipe

Base Discounts, f.o.b. Pittsburgh District and Lorain, Ohio, Mills

Steel		Iron	
Inches	Black	Inches	Black
1½.....	45	1½ to 2½.....	+11 +39
2.....	51	2½.....	22 2
2½ to 3.....	58	3.....	28 11
3.....	60	3½.....	30 12
3½ to 4.....	62	4.....	
4.....	55	4½.....	23 7
4½ to 6.....	59	6.....	26 11
6.....	56	6½ to 8.....	28 13
6½ to 8.....	54	8.....	26 11
8 and 10.....	54	10.....	
10 and 12.....	58	12.....	

Lap Weld

2.....	55	4½.....	23 7
2½ to 6.....	59	6.....	26 11
6.....	56	6½ to 8.....	28 13
6½ to 8.....	54	8.....	26 11
8 and 10.....	54	10.....	
10 and 12.....	58	12.....	

Butt Weld, extra strong, plain ends

1½.....	41	2½.....	24 19
2.....	47	3.....	21 17
2½ to 3.....	47	3½.....	28 13
3.....	53	4.....	30 14
3½.....	58	4½.....	
4.....	60	5.....	
4½ to 6.....	61	6.....	
6.....	58	6½ to 8.....	
6½ to 8.....	54	8.....	
8 and 10.....	54	10.....	
10 and 12.....	58	12.....	

Lap Weld, extra strong, plain ends

2.....	53	4½.....	23 7
2½ to 4.....	57	6.....	26 11
4½ to 6.....	56	6½ to 8.....	28 14
6.....	52	8.....	21 16
6½ to 8.....	45	9 to 12.....	16 9
8 and 10.....	45		
10 and 12.....	44		

On carloads the above discounts on steel pipe are increased on black by one point, with supplementary discount of 5 and 2½%, and on galvanized by 1½ points, with supplementary discount of 5 and 2½%. On iron pipe, both black and galvanized, the above discounts are increased to jobbers by one point with supplementary discounts of 5 and 2½%.

Note.—Chicago district mills have a base two points less than the above discounts. Chicago delivered base is 2½ points less. Freight is figured from Pittsburgh, Lorain, Ohio, and Chicago district mills, the billing being from the point producing the lowest price to destination.

Boiler Tubes

Base Discounts, f.o.b. Pittsburgh

Lap Welded Steel		Charcoal Iron	
2 to 2½ in.....	27	1½ in.....	+11
2½ to 2¾ in.....	27	1¾ to 1½ in.....	+2
3 in.....	40	2 to 2½ in.....	7
3½ to 3¾ in.....	42½	2½ to 3 in.....	7
4 to 4½ in.....	46	3½ to 4 in.....	9

Beyond the above discounts, 7 fives extra are given on lap welded steel tubes and 2 tens to 2 tens and 1 five on charcoal iron tubes.

Standard Commercial Seamless Boiler Tubes

Cold Drawn	
1 in.....	60
1½ to 1¾ in.....	53
1¾ in.....	36
2 to 2½ in.....	31
2½ to 2¾ in.....	39
3 in.....	51
3½ to 3¾ in.....	51
4 in.....	51
4½, 5 and 6 in.....	51

Hot Rolled

2 and 2½ in.....	37
2½ and 2¾ in.....	45
3 in.....	51

Less carloads, 4 points less. Add \$8 per net ton for more than four gages heavier than standard. No extra for lengths up to and including 24 ft. Sizes smaller than 1 in. and lighter than standard gage to be held at mechanical tubes list and discount. Intermediate sizes and gages not listed take price of next larger outside diameter and heavier gage.

Seamless Mechanical Tubing

	Per Cent Off List
Carbon, 0.10% to 0.30%, base.....	55
Carbon, 0.30% to 0.40%, base.....	50
Plus differentials for lengths over 18 ft. and for commercial exact lengths. Warehouse discounts on small lots are less than the above.	

contracts into the second quarter to create doubt about the maintenance of the higher prices named about five weeks ago.

Cold-Rolled Strips.—There seems to be some wavering in prices, particularly as applying to the large tonnage buyers, whose recent tendency to hold back specifications with an idea of conserving tonnage for April shipment has prompted increased sales efforts by some producers. If there has not been actual extension of first quarter contracts, there has been acceptance of additional tonnage on first quarter contracts and at first quarter prices. On the large tonnages, therefore, the test of the higher prices announced late in January has been further deferred. There has been a gain in orders but at the expense of prices.

Bolts, Nuts and Rivets.—Rivet makers are insisting firmly on the higher prices recently named, and while very little current business carries the advance, buyers being covered quite generally for this quarter at the old prices, all second quarter contracts are at the new prices. It is of course early for specifications against these contracts. Bolt and nut business is better now than it was at the outset of the year, but is not taxing productive capacity.

Coke and Coal.—Outside of the usual contracting for coal for the year beginning April 1 and some interest on the part of gas companies in furnace coke, the market is devoid of life and of fresh developments. Anxiety on the part of coal operators for backlog tonnage and the keen competition offered by southern West Virginia mines combine to keep prices on future shipments low. The spot market continues depressed by the fact that offerings exceed the demand. Contracting for second quarter tonnages of both furnace and foundry coke is pretty well completed. Almost no spot demand exists for coke for blast furnaces, but gas producers are seeking tonnages of low ash coke, one inquiry calling for approximately 75,000 tons. Producers still are trying to get \$2.85 per net ton at ovens on contract furnace coke and \$2.75 for spot tonnages, but the actual market is 10c. to 15c. per ton lower.

Old Material.—The event of the week has been a sale of 5000 tons or more of compressed sheets at \$15, which is as much as can be obtained for the best of the ordinary heavy melting steel and actually is 25c. per ton more than was paid within the week for a fair-sized lot of that grade. This situation is unusual and may be expected to change quickly. Some consumers in this district prefer the carefully prepared compressed sheet scrap out of Detroit to the regular run of heavy melting steel at even prices, and it is said that purchases also were prompted by fears of a diversion of

shipments from Detroit with the opening of the Lake shipping season. While the general scrap market appears weak on the surface and actually is weak on machine shop turnings and blast furnace grades, it is noted that offerings of heavy melting steel at prices under \$15 are small, and there is not a dealer who would take orders for strictly No. 1 railroad steel at less than \$15.50. The steel in the March list of the Pennsylvania Railroad sold at \$15.35 delivered this district. Taking in railroad steel, heavy melting grade is quotable here at \$14.50 to \$15.50, the lower price applying to small lots picked up by dealers.

Prices per gross ton delivered consumers' yards in Pittsburgh and points taking the Pittsburgh district freight rate:

Basic Open-Hearth Furnace Grades:	
Heavy melting steel.....	\$14.50 to \$15.00
Scrap rails	14.50 to 15.00
Compressed sheet steel.....	14.00 to 14.25
Bundled sheets, sides and ends...	13.00 to 13.50
Cast iron carwheels	14.50 to 15.00
Sheet bar crops, ordinary.....	15.00 to 15.50
Heavy breakable cast	13.00 to 13.50
No. 2 railroad wrought	15.00 to 15.50
Heavy steel axle turnings.....	13.00 to 13.50
Machine shop turnings.....	10.00 to 10.50
Acid Open-Hearth Furnace Grades:	
Railroad knuckles and couplers...	16.50 to 17.00
Railroad coil and leaf springs...	16.50 to 17.00
Rolled steel wheels	16.50 to 17.00
Low phosphorus billet and bloom ends	18.50 to 19.00
Low phosphorus, mill plate.....	17.50 to 18.00
Low phosphorus, light grade.....	16.50 to 17.00
Low phosphorus sheet bar crops...	17.50 to 18.00
Heavy steel axle turnings.....	13.00 to 13.50
Electric Furnace Grades:	
Low phosphorus punchings.....	16.50 to 17.00
Heavy steel axle turnings.....	13.00 to 13.50
Blast Furnace Grades:	
Short shoveling steel turnings...	10.50
Short mixed borings and turnings	10.50
Cast iron borings.....	10.50
No. 2 busheling	9.50 to 10.00
Rolling Mill Grades:	
Steel car axles	18.00 to 19.00
No. 1 railroad wrought	11.00 to 11.50
Sheet bar crops	17.00 to 17.50
Cupola Grades:	
No. 1 cast	14.50 to 15.00
Rails 3 ft. and under.....	15.00 to 15.25
Malleable Grades:	
Railroad	14.25 to 14.75
Industrial	13.75 to 14.25
Agricultural	13.25 to 13.75

Gain in Steel Barrel Output

Steel barrels to the number of 518,944 were manufactured in February, a gain of 43,038 over the longer month of January, according to reports received by the Department of Commerce, Washington, from 27 companies owning or operating 31 plants. Shipments were 514,362 and 474,159 barrels respectively, and stocks at the end of the two months were 58,935 and 54,353 barrels. Unfilled orders for delivery within 30 days at the end of February totaled 297,889 barrels, against 241,145 at the end of January. Orders for delivery beyond 30 days were 1,119,738 and 1,110,652 barrels respectively.

Production in February was the highest for any month since October. It compares with 504,134 units in February, 1927, and with 522,486 in February, 1926.

Shipments by members of the Steel Barrel Manufacturers Association in February were 313,163 barrels and orders unfilled March 1 were for 469,553 units. Operation was at 28.7 per cent of capacity for I. C. C. barrels and 52 per cent for light barrels. Total business during the month was \$949,825.

The United States Steel Products Co. has been awarded the contract for 1050 tons of 30-ft. round deformed structural reinforcing steel bars for the Panama Canal, the prices being on a delivered basis at either Balboa or Cristobal. The quotations were 2.435c. per lb. for 150 tons of ¾-in. bars; 2.235c. for 300 tons of ½-in. bars; 2.135c. for 175 tons of ¾-in. bars and 2.035c. for 100 tons of ¾-in., 75 tons of ½-in. and 250 tons of 1-in. bars. Delivery is to be made within 18 to 21 days.

Warehouse Prices, f.o.b. Pittsburgh

	Base per Lb.
Plates	3.00c.
Structural shapes	3.00c.
Soft steel bars and small shapes.....	2.90c.
Reinforcing steel bars	2.75c.
Cold-finished and screw stock—	
Rounds and hexagons.....	3.60c.
Squares and flats	4.10c.
Bands	3.60c.
Hoops	4.00c. to 4.50c.
Black sheets (No. 24 gage), 25 or more bundles	3.65c.
Galvanized sheets (No. 24 gage), 25 or more bundles	4.50c.
Blue annealed sheets (No. 10 gage), 25 or more sheets	3.10c.
Galvanized corrugated sheets (No. 28 gage), per square	\$4.39
Spikes, large	3.30c. to 3.40c.
Small	3.80c. to 5.25c.
Boat	3.80c.
Track bolts, all sizes, per 100 count,	62½ per cent off list
Machine bolts, per 100 count, 62½ per cent off list	
Carriage bolts, per 100 count, 62½ per cent off list	
Nuts, all styles, per 100 count,	62½ per cent off list
Large rivets, base per 100 lb....	\$3.50
Wire, black soft annealed, base per 100 lb	\$3.00 to 3.10
Wire, galvanized soft, base per 100 lb.	3.00 to 3.10
Common wire nails, per keg....	3.00
Cement coated nails, per keg....	3.05

Semi-Finished Steel, Raw Materials, Bolts and Rivets

Mill Prices of Semi-Finished Steel

F.o.b. Pittsburgh or Youngstown

Billets and Blooms

	Per Gross Ton
Rerolling, 4-in. and over.....	\$33.00
Rerolling, under 4-in. to and including 1 1/4 in.....	\$33.50 to 34.00
Forging, ordinary.....	38.00 to 39.00
Forging, guaranteed.....	43.00 to 44.00

Sheet Bars

	Per Gross Ton
Open-hearth or Bessemer.....	\$34.00

Slabs

	Per Gross Ton
8 in. x 2 in. and larger.....	\$33.00
Smaller than 8 in. x 2 in.....	34.00

Skelp

	Per Lb.
Grooved	1.85c. to 1.90c.
Sheared	1.85c. to 1.90c.
Universal	1.85c. to 1.90c.

Wire Rods

	Per Gross Ton
*Common soft, base	\$44.00
Screw stock	\$5.00 per ton over base

*Chicago mill base is \$45. Cleveland mill base, \$44.

Prices of Raw Material

Ores

Lake Superior Ores, Delivered Lower Lake Ports

	Per Gross Ton
Old range Bessemer, 51.50% iron.....	\$4.55
Old range non-Bessemer, 51.50% iron.....	4.40
Mesabi Bessemer, 51.50% iron.....	4.40
Mesabi non-Bessemer, 51.50% iron.....	4.25
High phosphorus, 51.50% iron.....	4.15
Foreign Ore, c.i.f. Philadelphia or Baltimore	Per Unit
Iron ore, low phos., copper free, 55 to 58% iron in dry Spanish or Algeria.....	10.00c.
Iron ore, Swedish, average 66% iron, 9.25c. to 9.50c.	
Manganese ore, washed, 52% manganese, from the Caucasus	39c.
Manganese ore, Brazilian, African or Indian, basis 50%	38c. to 39c.
Tungsten ore, high grade, per unit, in 60% concentrates	\$10.25 to \$10.75
Chrome ore, 45 to 50% Cr ₂ O ₃ , crude, c.i.f. Atlantic seaboard	\$22.00 to \$24.00
Molybdenum ore, 85% concentrates of MoS ₃ , delivered	50c. to 55c.

Coke

	Per Net Ton
Furnace, f.o.b. Connellsville prompt	\$2.60 to \$2.75
Foundry, f.o.b. Connellsville prompt	3.75 to 4.50
Foundry, by-products, Ch'go ovens	9.00
Foundry, by-product, New England, del'd	11.50
Foundry, by-product, Newark or Jersey City, delivered.....	9.45 to 9.85
Foundry, Birmingham	5.00
Foundry, by-products, St. Louis.....	9.75

Coal

	Per Net Ton
Mine run steam coal, f.o.b. W. Pa. mines	\$1.40 to \$1.80
Mine run coking coal, f.o.b. W. Pa. mines	1.50 to 1.75
Gas coal, 1/4-in., f.o.b. Pa. mines.....	2.00 to 2.10
Mine run gas coal, f.o.b. Pa. mines	1.75 to 1.90
Steam slack, f.o.b. W. Pa. mines.....	0.90 to 1.00
Gas slack, f.o.b. W. Pa. mines.....	1.00 to 1.10

Ferromanganese

	Per Gross Ton
Domestic, 80%, furnace or seab'd.....	\$100.00
Foreign, 80%, Atlantic or Gulf port, duty paid	100.00

Spiegeleisen

	Per Gross Ton Furnace
Domestic, 19 to 21%.....	\$31.00 to \$32.00
Domestic, 16 to 19%.....	29.00

Electric Ferrosilicon

	Per Gross Ton Delivered
50%	\$83.50 to \$88.50
75%	130.00 to 140.00
	Per Gross Ton Furnace
10%	\$35.00
11%	37.00
	Per Gross Ton Furnace
12%	\$39.00
14 to 16%	45.00

Bessemer Ferrosilicon

	Per Gross Ton
F.o.b. Jackson County, Ohio, Furnace	
10%	\$30.00
11%	32.00
	Per Gross Ton
12%	\$34.00

Silvery Iron

	Per Gross Ton
F.o.b. Jackson County, Ohio, Furnace	
6%	\$23.00
7%	24.00
8%	25.00
9%	26.00
	Per Gross Ton
10%	\$28.00
11%	30.00
12%	32.00

Other Ferroalloys

Ferrotungsten, per lb. contained metal, del'd	92c. to 95c.
Ferrochromium, 4 to 6% carbon and up, 65 to 70% Cr., per lb. contained Cr. delivered, in carloads	11.00c.
Ferrovandium, per lb. contained vanadium, f.o.b. furnace	\$3.15 to \$3.65
Ferrocobaltititanium, 15 to 18%, per net ton, f.o.b. furnace, in carloads.....	\$200.00
Ferrophosphorus, electric or blast furnace material, in carloads, 18%, Rockdale, Tenn., base, per gross ton.....	\$91.00
Ferrophosphorus, electric, 24%, f.o.b. Anniston, Ala., per gross ton.....	\$122.50

Fluxes and Refractories

Fluorspar

	Per Net Ton
Domestic, 85% and over calcium fluoride, not over 5% silica, gravel, f.o.b. Illinois and Kentucky mines	\$15.00
No. 2 lump, Illinois and Kentucky mines.....	\$20.00
Foreign, 85% calcium fluoride, not over 5% silica, c.i.f. Atlantic port, duty paid.....	\$15.50
Domestic, No. 1 ground bulk, 95 to 98% calcium fluoride, not over 2 1/4% silica, f.o.b. Illinois and Kentucky mines.....	\$32.50

Fire Clay

	Per 1000 f.o.b. Works
First Quality	
Second Quality	
Pennsylvania	\$43.00 to \$46.00
Maryland	43.00 to 46.00
New Jersey	50.00 to 65.00
Ohio	43.00 to 46.00
Kentucky	43.00 to 46.00
Missouri	43.00 to 46.00
Illinois	43.00 to 46.00
Ground fire clay, per ton	7.00

Silica Brick

	Per 1000 f.o.b. Works
Pennsylvania	\$43.00
Chicago	52.00
Birmingham	50.00
Silica clay, per ton.....	\$8.50 to 10.00

Magnesite Brick

	Per Net Ton
Standard sizes, f.o.b. Baltimore and Chester, Pa.	\$65.00
Grain magnesite, f.o.b. Baltimore and Chester, Pa.	40.00

Chrome Brick

	Per Net Ton
Standard size	\$45.00

Mill Prices of Bolts, Nuts, Rivets and Set Screws

Bolts and Nuts

	Per 100 Pieces
(F.o.b. Pittsburgh, Cleveland, Birmingham or Chicago)	
	Per Cent Off List
†Machine bolts	70
†Carriage bolts	70
Lag bolts	70
Flow bolts, Nos. 1, 2, 3 and 7 heads.....	70
Hot-pressed nuts, blank or tapped, square.....	70
Hot-pressed nuts, blank or tapped, hexagons.....	70
C.p.c. and t. square or hex. nuts, blank or tapped	70
Washers*	6.75c. to 6.50c. per lb. off list

*F.o.b. Chicago, New York and Pittsburgh.
†Bolts with rolled thread up to and including 1/2 in. x 6 in. take 10 per cent lower list prices.

Bolts and Nuts

	Per Cent Off List
Semi-finished hexagon nuts	70
Semi-finished hexagon castellated nuts, S.A.E.....	70
Stove bolts in packages, Pittsburgh.....	80, 10 and 2 1/2
Stove bolts in packages, Chicago.....	75, 20, 10 and 5
Stove bolts in bulk, Pittsburgh.....	80, 10 and 5
Stove bolts in bulk, Chicago.....	75, 20, 10, 5 and 2 1/2
Tire bolts	60, 5 and 5

Discounts of 70 per cent off on bolts and nuts applied on carload business. For less than carload orders discounts of 55 to 60 per cent apply.

Large Rivets

	Base per 100 Lb.
(1/2-In. and Larger)	
F.o.b. Pittsburgh or Cleveland.....	\$2.90
F.o.b. Chicago	3.00

Small Rivets

	Per Cent Off List
(1/4-In. and Smaller)	
F.o.b. Pittsburgh	70 and 10
F.o.b. Cleveland	70 and 10
F.o.b. Chicago	70 and 10 to 70

Cap and Set Screws

(Freight allowed up to but not exceeding 50c. per 100 lb. on lots of 200 lb. or more)

	Per Cent Off List
Milled cap screws.....	80, 10 and 10
Milled standard set screws, case hardened, 80 and 10	
Milled headless set screws, cut thread.....	80 and 10
Upset hex. head cap screws, U.S.S. thread, 85 and 5	
Upset hex. cap screws, S.A.E. thread.....	85 and 5
Upset set screws.....	80, 10 and 10
Milled studs	70 and 5

Chicago

Steel Specifications Continue in Heavy Volume—Price Resistance Lessens

CHICAGO, March 20.—Specifications for finished steel continue in large volume, the past week having been the fourth largest of the year. Purchases are on the increase, but the total falls short of the current shipping rate. The fact that buying is expanding lends strength to the experience of some sellers that resistance to price advances is less pronounced and that a larger portion of current shipments may be going into actual production than had been supposed earlier in the month. Ingot production in this district remains steady, and steel mill backlogs range from six to eight weeks.

Open weather has started the movement of automobiles away from dealers' floors and an increased demand for steel by automobile plants and parts makers is noted. The Overland factories are reported to be on a daily schedule of 1300 cars and Chevrolet has planned a schedule of 370,000 cars to be built in the second quarter.

The Chicago & Eastern Illinois has received revised proposals on 500 freight cars, but is withholding orders until a study can be made of building cost in its own shops. Fresh railroad equipment inquiry is confined to 100 motor cars and 100 trailers by the Chicago Rapid Transit Co.

Pig Iron.—An interesting situation in this market is that second quarter coverage, which is now about 30 per cent completed, is heavier than for either the first quarter of this year or for the second quarter in 1927. Since inventories are usually run low at the end of the year, it is to be expected that first quarter contracts should be heavier than for the second period. Foundry iron production is steady and producers continue to draw on stocks for the difference between output and shipping orders. While forward buying is slowing down, there is an increased tonnage of spot business and also evidence that many purchasers underestimated their requirements for the first quarter. Several users to the west have ordered April iron delivered in March. A foundry in southern Wisconsin has ordered 2500 tons. An inquiry is out for 250 tons of charcoal iron, and brokers are trying to dispose of 500 tons of basic iron that is on track in Chicago. The silvery price schedule is steady, and forward contracting is making fair progress. Low phosphorus iron sales are confined to car lots.

Prices per gross ton at Chicago:

Northern No. 2 foundry, sil. 1.75 to 2.25	\$18.50
N'th'n No. 1 fdy., sil. 2.25 to 2.75	19.00
Malleable, not over 2.25 sil.	18.50
High phosphorus	18.50
Lake Superior charcoal, averaging sil. 1.50	27.04
Southern No. 2 fdy. (all rail)...	22.01
Southern No. 2 (barge and rail)	21.18
Low phos., sil. 1 to 2 per cent, copper free	\$28.50 to 29.00
Silvery, sil. 8 per cent.....	29.79
Bessemer ferro-silicon, 14 to 15 per cent	46.79

Prices are delivered consumers' yards except on Northern foundry, high phosphorus and malleable, which are f.o.b. local furnace, not including an average switching charge of 61c. per gross ton.

Ferroalloys.—Specifications for ferroalloys are heavy, but new buying is confined to car lot sales. Current quotations on ferromanganese are \$100, seaboard, and spiegeleisen of the 19 to 21 per cent grade in carloads is being sold at \$32, Hazard, Pa.

Prices delivered Chicago: 80 per cent ferromanganese, \$107.56; 50 per cent ferro-silicon, \$83.50 to \$87.50; spiegeleisen, 19 to 21 per cent, \$38.76 to \$39.76.

Plates.—New business in plates is confined to a moderate tonnage placed for second quarter requirements. Following the placing of 25,000 to 30,000 tons of tankage materials in the last few weeks, fresh inquiry has developed for 5000 tons from an oil producer in Texas. Specifications from car builders are of fair size, but new railroad equipment orders are needed if the rate is to be sustained. Reports vary as to the probability

of early orders for cars from the Chicago, Milwaukee, St. Paul & Pacific. In some quarters it is believed that at least a portion of the requirements will be placed in the next 10 days. Following several weeks of uncertainty as to the trend of prices for plates, it now appears that 2c., Chicago, is well established for lots of 100 tons each or more. By the latter part of this week mill shipments will start against business taken at this figure. Deliveries range from four to six weeks.

Mill prices on plates per lb.: 2.00c., base Chicago.

Structural Material.—News in the construction field this week is concerned more with records of the immediate past than with what the future holds. Cost of new building construction started in February in Illinois was in excess of \$84,000,000, of which \$63,500,000 was for work in Chicago. Both of these totals establish records for the second month of the year. In the first two months of this year building construction in Illinois gained 61 per cent over January and February, 1927. The several large tonnage projects on which the trade in this district has been waiting give no indication that they are beyond the designing stage. In the meantime, competition among shops grows keener for the daily lettings of small size, and prices for fabricated materials are unstable and show a tendency to seek lower levels. Mill prices, however, are well stabilized at 2c., Chicago. The Buick Motor Co. has purchased property in Chicago and will erect a warehouse having 240,000 sq. ft. of floor space.

Mill prices on plain material per lb.: 2.00c., base, Chicago.

Bars.—Demand for mild steel bars is steady, with new buying running equal to and specifications well ahead of shipments. No recession is noted in activity among farm implement manufacturers, while greater speed of production is the aim of tractor builders, who are feeling the impulse of added business brought about through discontinuance of tractor assembly by one of the largest makers. Soft steel bars are commonly priced at 2c., Chicago. Larger producers still adhere to 2.10c. for lots of less than 100 tons each, but some mills are waiving the extra \$2 a ton regardless of the size of the order. Spot orders for iron bars at 2c., Chicago, are more numerous, but the aggregate tonnage is not large. Forward contracting is light. Alloy bar mills continue to operate at not far from capacity. Contracting is moderately active at the new base price, which is 2.65c., f.o.b. maker's mill. In rail steel bars, new business is equal to and specifications are fully 15 per cent above shipments. For the most part purchasers are taking this commodity at close range and as a result future buying has gained little momentum. Deliveries are made in two to three weeks, and prices are steady at 1.80c. to 1.85c., Chicago Heights. Bed manufacturers are speeding production and barn equipment makers are taking their full schedules. Shipments of fence posts are normal for this time of the year.

Mill prices per lb.: Soft steel bars, 2.00c. base, Chicago; common bar iron, 2.00c., base, Chicago; rail steel bars, 1.80c. to 1.85c., base, Chicago Heights mill.

Wire Products.—Specifications against contracts and new orders for immediate shipment to wire mills are heavier, and production has more than gained the two points lost a week or 10 days ago. In fact, output is now close to 77 per cent of mill capacity. Some improvement is noted in shipments of wire nails, although this commodity is not as active as it should be at this time of the year. It is evident that jobbers' stocks are more than ample and mill stocks in wire nails are growing larger. Woven wire fencing is moving steadily and orders for barbed wire are of good size. Slackening in the demand from jobbers, noted in the Middle West a week ago, is no longer in evidence. Orders are somewhat more plentiful from the Northwest. Prices for wire and wire products are shown on page 821.

Rails and Track Supplies.—A Western railroad has bought 5000 tons of standard-section rails. Inquiry before the trade is of small size. Rail mill operations in this district are steady at 90 per cent of capacity. A steam operated railroad has closed for 5000 tons of track accessories and two roads have come into the market for a total of 12,000 tons. Track supply pro-

duction has reached the highest point so far this year. Light rail orders are confined to carloads.

Cast Iron Pipe.—Evidence is at hand that the spring buying movement in cast iron pipe is under way and with it comes a stronger tone in prices. Detroit will open bids March 26 on 2000 tons of 16-in. class C pipe and Chicago will buy 3200 tons of 24 and 48-in. class B pipe. Milwaukee will soon buy 450 tons of 30-in. pipe and Oshkosh, Wis., will purchase a round tonnage on March 29. James B. Clow & Sons have taken 2000 tons for Columbus, Ohio, at \$34.95, delivered, or \$27.95, Birmingham, a figure \$1 a ton above those on recent lettings. A contractor's award of 1100 tons at Berea, Ohio, is said to have been taken at \$28.35, Birmingham. La Porte, Ind., has closed for 230 tons of 6, 10 and 12-in. pipe at \$29, Birmingham. Recent quotations show that attractive tonnages now bring \$28 to \$29, Birmingham, for 6-in. and larger diameters, while on less attractive orders as high as \$31 is obtained. Delivered prices at Chicago range from \$36.20 to \$39.20. Public utilities are buying in small lots. The Northern Indiana Public Service Co. contemplates the construction of a gas line from Valparaiso to Michigan City, Ind., a distance of 23 miles.

Prices per net ton, delivered Chicago: Water pipe, 6-in. and over, \$36.20 to \$39.20; 4-in., \$40.20 to \$43.20; Class A and gas pipe, \$4 extra.

Sheet Bars.—Specifications are heavy and prices are firm at \$34 per gross ton.

Bolts, Nuts and Rivets.—Second quarter contracting is not far from 50 per cent completed, and little resistance has been offered to recent advances in prices. Production in this district is not far from 75 per cent of capacity, but for the country as a whole the rate is a shade less. Specifications for bolts and nuts from the railroads are more numerous and in larger total volume.

Prices f.o.b. mill, per gross ton: Standard-section open-hearth and Bessemer rails, \$43; light rails, rolled from billets, \$36. *Per lb.:* Standard railroad spikes, 2.80c.; track bolts with square nuts, 3.80c.; steel tie plates, 2.25c.; angle bars, 2.75c.

Sheets.—The volume of specifications is well sustained, and hot mills are now scheduled two to three weeks ahead, while output averages 90 per cent of capacity. Territorially, the demand is widespread except for the Northwest, where the winter is not yet broken. Among the more active users may be named the roofing trade and manufacturers of small tanks. Distribution from warehouses has grown measurably in the last week. Forward buying is dull, but spot purchases are quite active. Chicago delivered prices are steady at 3.05c. for black, 3.90c. for galvanized and 2.25c. to 2.35c. for blue annealed.

Base prices per lb., delivered from mill in Chicago: No. 24 black, 3.05c.; No. 24 galvanized, 3.90c.; No. 10 blue annealed, 2.25c. to 2.35c. Delivered prices at other Western points are equal to the freight from Gary plus the mill prices, which are 5c. per 100 lb. lower than the Chicago delivered prices.

Warehouse Prices, f.o.b. Chicago

	Base per Lb.
Plates and structural shapes.....	3.10c.
Soft steel bars	3.00c.
Reinforcing bars, billet steel.....	2.25c. to 2.75c.
Cold-finished steel bars and shafting—	
Rounds and hexagons	3.60c.
Flats and squares	4.10c.
Bands	3.65c.
Hoops	4.15c.
Black sheets (No. 24)	3.95c.
Galvanized sheets (No. 24)	4.80c.
Blue annealed sheets (No. 10).....	3.50c.
Spikes, standard railroad	3.55c.
Track bolts	4.55c.
Rivets, structural	3.60c.
Rivets, boiler	3.60c.
	Per Cent Off List
Machine bolts	60
Carriage bolts	60
Coach or lag screws	60
Hot-pressed nuts, squares, tapped or blank..	60
Hot-pressed nuts, hexagons, tapped or blank..	60
No. 8 black annealed wire, per 100 lb.....	\$3.20
Common wire nails, base per keg.....	3.00
Cement coated nails, base per keg.....	2.90

Reinforcing Bars.—Two 1000-ton projects are holding the attention of local dealers. One, a printing plant for the Reuben H. Donnelley Corporation, is up for bids. The 1000 tons for the *Daily News* building is assured of early placement as the foundation work on the structure is well advanced. Recent large tonnage awards, coupled with a greater number of orders for less than 100 tons, are strengthening the position of bar dealers who have speeded shop operations. Prices for reinforcing bars are more stable at 2.25c. to 2.75c. for billet stock bars out of warehouses, and 1.85c. to 1.95c., Chicago Heights, for the rail steel commodity. Recent awards and fresh inquiry are shown on page 836.

Coke.—Shipments are gaining slowly. All Chicago ovens are lighted, and the foundry by-product grade is quoted at \$9, local ovens, and at \$9.50, delivered in the Chicago switching district.

Old Material.—Tendencies in the Chicago scrap market are mixed. Steel mill buyers, who recently purchased heavy melting steel at \$13.25 per gross ton, delivered, are now offering \$13. The same interests, however, have taken 2000 tons of cast iron borings at 25c. up, or at \$10.25 per gross ton, delivered. Brokers are having no trouble in covering on borings, but for heavy melting steel they are often forced to pay \$13 for acceptable grades. A recent purchase of rerolling rails brought \$14.75 per gross ton. This is 25c. below recent consumer purchases and is the same price obtained by the railroads. Numerous specialties have turned active after many weeks of slow demand. Steel and gray iron foundry grades are being sought by melters. The Gary mills are purchasing scrap from time to time, and with the greater consumption in this district country scrap has again started to flow to Chicago. The Chicago, Rock Island & Pacific is offering 5000 tons.

Prices delivered consumers' yards, Chicago: Per Gross Ton

Basic Open-Hearth Grades:	
Heavy melting steel.....	\$12.50 to \$13.00
Shoveling steel	12.50 to 13.00
Frogs, switches and guards, cut apart, and miscellaneous rails.	13.50 to 14.00
Hydraulic compressed sheets....	11.00 to 11.50
Drop forge flashings	9.75 to 10.25
Forged, cast and rolled steel carwheels	15.50 to 16.00
Railroad tires, charging box size.	16.50 to 17.00
Railroad leaf springs, cut apart..	16.50 to 17.00
Acid Open-Hearth Grades:	
Steel couplers and knuckles.....	14.00 to 14.50
Coil springs	16.50 to 17.00
Electric Furnace Grades:	
Axle turnings	13.00 to 13.50
Low phosphorus punchings.....	14.25 to 14.75
Low phosphorus plate, 12 in. and under	13.75 to 14.25
Blast Furnace Grades:	
Axle turnings	10.00 to 10.50
Cast iron borings	9.75 to 10.25
Short shoveling turnings	9.75 to 10.25
Machine shop turnings	7.00 to 7.50
Rolling Mill Grades:	
Iron rails	13.50 to 14.00
Rerolling rails	14.50 to 15.00
Cupola Grades:	
Steel rails less than 3 ft.....	15.00 to 15.50
Angle bars, steel.....	14.00 to 14.50
Cast iron carwheels.....	14.00 to 14.50
Malleable Grades:	
Railroad	12.50 to 13.00
Agricultural	12.00 to 12.50
Miscellaneous:	
*Relaying rails, 56 to 60 lb.....	23.00 to 25.00
*Relaying rails, 65 lb. and heavier.	26.00 to 31.00
Per Net Ton	
Rolling Mill Grades:	
Iron angle and splice bars.....	14.00 to 14.50
Iron arch bars and transoms....	13.75 to 19.25
Iron car axles	21.50 to 22.00
Steel car axles	16.00 to 16.50
No. 1 railroad wrought.....	11.00 to 11.50
No. 2 railroad wrought.....	11.00 to 11.50
No. 1 busheling	9.25 to 9.75
No. 2 busheling.....	5.25 to 5.75
Locomotive tires, smooth.....	12.50 to 13.00
Pipes and flues	8.00 to 8.50
Cupola Grades:	
No. 1 machinery cast	14.50 to 15.00
No. 1 railroad cast	12.50 to 13.00
No. 1 agricultural cast	12.50 to 13.00
Stove plate	11.25 to 11.75
Grate bars	11.25 to 11.75
Brake shoes	11.00 to 11.50

*Relaying rails, including angle bars to match, are quoted f.o.b. dealers' yards.

Philadelphia

Pig Iron Quiet—Steel Business Largely Confined to Contract Shipments

PHILADELPHIA, March 20.—Most mills are endeavoring to maintain 1.90c., Pittsburgh, on bars; 2.05c., Coatesville, on plates, and 2.05c., Bethlehem, on shapes for current delivery and second quarter contracts. Consumers, however, are in most cases covered for the next quarter at prices \$1 a ton lower. There is very little purchasing for prompt shipment, as buyers are apparently covered for all or more than they will require for the rest of the present quarter. Mills expect a large number of consumers to specify fully against current contracts by the end of this month.

There is a fair tonnage of steel in fabricated projects, of which bridge construction is a feature. Activity in new construction appears to be in prospect, with the city considering expenditures for public works to relieve unemployment and the United Gas Improvement Co. reported as contemplating considerable construction in the belief that the time is opportune from the standpoint of costs of materials and labor.

Consumers of pig iron have thus far purchased only moderately for the next quarter, their present rate of operation in most cases promising a carry-over of present contracts well into the second quarter. Recent sales of Buffalo iron in this district have also been a factor, buyers preferring to await possible price developments from this competition.

Pig Iron.—Buyers do not seem to expect any advance in the present market of \$20, furnace, on foundry iron, and as their present contracts are in many cases sufficient to carry them well into the next quarter, not much interest has developed in new contracting. The competition of Buffalo iron has caused some hesitation, consumers preferring to await further price developments. Recent inquiries have included 600 tons of foundry iron and 50 tons of basic for the Hilles & Jones plant of the Consolidated Machine Tool Corporation at Wilmington, Del., and about 900 tons of foundry for the Foran Foundry & Mfg. Co., Flemington, N. J. No further purchasing of basic is reported.

Prices per gross ton at Philadelphia:

East. Pa. No. 2 plain, 1.75 to 2.25 sil.	\$20.76
East. Pa. No. 2X, 2.25 to 2.75 sil.	21.26
East. Pa. No. 1X.	21.76
Basic (delivered eastern Pa.)	\$19.50 to 20.00
Gray forge	19.75 to 20.25
Malleable	21.00 to 21.50
Standard low phos. (f.o.b. New York State furnace)	23.00 to 24.00
Copper bearing low phos. (f.o.b. furnace)	23.50 to 24.00
Virginia No. 2 plain, 1.75 to 2.25 sil.	24.54 to 25.04
Virginia No. 2X, 2.25 to 2.75 sil.	25.04 to 25.54

Prices, except as specified otherwise, are delivered Philadelphia. Freight rates: 76c. to \$1.64 from eastern Pennsylvania furnaces; \$4.54 from Virginia furnaces.

Warehouse Prices, f.o.b. Philadelphia

	Base per Lb.
Plates, ¼-in. and heavier	2.50c. to 2.60c.
Plates, ⅜-in.	2.80c. to 3.00c.
Structural shapes	2.40c. to 2.60c.
Soft steel bars, small shapes and iron bars (except bands)	2.50c.
Round-edge iron	3.50c.
Round-edge steel, iron finished 1½ x 1½ in.	3.50c.
Round-edge steel, planished	4.30c.
Reinforcing steel bars, square, twisted and deformed	2.50c. to 3.00c.
Cold-finished steel, rounds and hexagons	3.35c.
Cold-finished steel, squares and flats	3.85c.
Steel hoops	3.60c.
Steel bands, No. 12 gage to ⅝-in., inclusive	3.35c.
Spring steel	5.00c.
Black sheets (No. 24)	4.25c.
Galvanized sheets (No. 24)	5.10c.
Blue annealed sheets (No. 10)	3.15c.
Diamond pattern floor plates—	
¼-in.	5.30c.
⅜-in.	5.50c.
Rails	3.20c.
Swedish iron bars	6.60c.

Billets.—Only small tonnages are under inquiry. Rerolling grade continues at \$33 per ton, Pittsburgh, and forging quality at \$38, Pittsburgh.

Bars.—There is a lag in specifications, so that there may be some tonnage carried over into the next quarter unless extensions are refused by the mills. While 1.90c., Pittsburgh, is being quoted on both prompt business and second quarter contracts, most consumers are covered for the coming quarter at 1.85c. per lb., Pittsburgh.

Shapes.—Quotations for immediate shipment are 1.97½c. per lb., Pottsville, and 2.05c. per lb., Bethlehem, or 2.12c. to 2.18c., delivered Philadelphia. Although 2.05c., Bethlehem, is being quoted on second quarter contracts, it is admittedly difficult to maintain this in view of the large number of contracts already made at 2c., Bethlehem. Fabricators are working on a number of bridge contracts and some sizable projects are in prospect.

Plates.—Most mills are moderately active, but buyers evidently encounter no difficulty in getting prompt shipments. The pressure is still by the mills for more specifications rather than by consumers for deliveries. Prices are being maintained at 2.05c., Coatesville, or 2.15c., delivered Philadelphia, but contracts for next quarter have been made at 2c., Coatesville.

Sheets.—The blue annealed market seems to be quite firm at 2.10c., Pittsburgh. Occasionally 2.15c. per lb. is being obtained on small lots. Black sheets are 2.90c., Pittsburgh, and galvanized 3.75c., per lb., Pittsburgh, with occasional concessions.

Warehouse Business.—Concessions still appear on galvanized sheets and black sheets are inactive. Quantity differentials on bars and small shapes are being adhered to successfully and if differentials on bands are adopted by the mills generally warehouses will take like action.

Imports.—Pig iron arrivals at this port were the feature of the week ended March 17. Of a total of 8596 gross tons, 7947 tons came from the United Kingdom, 348 tons from India and 301 tons from the Netherlands. A total of 300 tons of spiegeleisen arrived from Germany. Steel imports consisted of 455 tons of shapes and 38 tons of bars from Belgium, 12 tons of strip steel and 52 tons of steel bars from Sweden.

Old Material.—Consumers show little interest in purchasing. No. 1 heavy melting steel is active only in shipments on contracts. A Phoenixville consumer is offering to purchase machine shop turnings at \$10 per ton, delivered, stove plate at \$11.50 per ton, and No. 2 heavy melting steel at \$11 per ton.

Prices per gross ton delivered consumers' yards, Philadelphia district:

No. 1 heavy melting steel	\$13.50 to \$14.00
Scrap T rails	13.00 to 13.50
No. 2 heavy melting steel	11.00 to 11.50
No. 1 railroad wrought	14.50 to 15.00
Bundled sheets (for steel works)	10.50 to 11.00
Machine shop turnings (for steel works)	10.50 to 11.00
Heavy axle turnings (or equivalent)	12.00 to 12.50
Cast borings (for steel works and rolling mill)	11.00
Heavy breakable cast (for steel works)	15.50 to 16.00
Railroad grate bars	12.00 to 12.50
Stove plate (for steel works)	12.00 to 12.50
No. 1 low phos., heavy, 0.04 per cent and under	17.50 to 18.00
Couplers and knuckles	16.00 to 16.50
Rolled steel wheels	15.50 to 16.00
No. 1 blast furnace scrap	10.50 to 11.00
Machine shop turnings (for rolling mill)	11.00
Wrought iron and soft steel pipes and tubes (new specifications)	12.50
Shafting	17.50 to 18.00
Steel axles	19.00 to 20.00
No. 1 forge fire	11.00 to 11.50
Steel rails for rolling	15.00 to 15.50
Cast iron carwheels	15.50 to 16.00
No. 1 cast	16.00 to 16.50
Cast borings (for chemical plant)	14.50 to 15.00

The January report of the interplant accident reporting system, industrial safety division of the Springfield, Mass., Safety Council, shows that 33 plants in Springfield and vicinity operated during the month without a loss-time accident. The report covers figures from 60 manufacturing concerns with 21,435 employees who worked 3,830,336 hr.

Cleveland

Steel Tonnage Exceeding February Rate —Motor Car Industry Heavy User

CLEVELAND, March 20.—Specifications for steel bars, plates and structural material against 1.80c. first quarter contracts continue heavy, and some of the mills have booked more tonnage so far this month than during the corresponding period in February. On new business, both for early shipment and for the second quarter, 1.85c., Pittsburgh, is still in effect. While some attempt is being made to establish the market on a 1.90c. basis, this price so far applies only to small miscellaneous lots. Most buyers, except some of the smaller consumers, have placed second quarter contracts at 1.85c. Some of the mills have advised their trade that specifications against 1.80c. contracts must be in by April 1, and this is bringing out specifications. This price will apply on much of the steel shipped in April. The new prices on alloy steel bars have not yet been tested, as they will not apply to contract consumers until after April 1. While there were some price reductions, four grades comprising over 90 per cent of the tonnage used, are advanced from \$2 to \$4 a ton.

The automotive industry continues to take steel in good volume against contracts, and it is now predicted that this industry will continue at good operation through the second quarter. However, the motor car builders are showing hesitancy in placing second quarter contracts. While some contracts have come from this source for sheets and hot and cold rolled strip steel at the currently quoted prices, the business has not been sufficient in volume to test the present prices, against which some resistance is being offered. The Ford Motor Co. is reported to have increased its production to 1600 cars per day with an expectation of a further increase to 2000 by the end of the week.

Structural inquiry is light in this territory, although fabricators are getting a good volume of small orders. Awards include 2500 tons for power transmission towers in northern Ohio. A bridge project in Louisville, Ky., involving 15,000 tons of structural shapes has been revived.

Pig Iron.—Buying for the second quarter is gradually tapering off, although furnaces are still taking a fair amount of business. Sales by Cleveland interests during the week totaled 23,000 tons. Quite a few sales were made in the northern Ohio territory, but the activity was more pronounced in Michigan and in Buffalo, where some business was taken for Eastern shipment. Two inquiries for foundry iron came out for the third quarter, one from a Kokomo, Ind., stove manufacturer for 1000 tons and the other from western Ohio for 3000 to 4000 tons. Some furnaces are not inclined to encourage third quarter buying at the present time and may not quote prices for that delivery for several weeks. Prices show no change. Cleveland furnaces are holding closely to \$17, furnace, shading this to \$16.75 only for shipment to extremely competitive points. One Lake furnace is on a \$17.50 basis except in Michigan, where the market is holding at \$18. Shipping orders from the automotive industry continue heavy and may show a gain this month over February. Shipments to jobbing foundries and to manufacturers

in some other fields show a slight gain. Malleable foundries are doing better than a few weeks ago. Low phosphorus iron is inactive.

Prices per gross ton at Cleveland:

N'th'n No. 2 fdy., sil. 1.75 to 2.25.....	\$18.50
Southern fdy., sil. 1.75 to 2.25.....	22.00
Malleable	18.50
Ohio silvery, 8 per cent.....	28.00
Basic, Valley furnace.....	17.00
Standard low phos., Valley furnace.....	\$26.50 to 27.00

Prices, except on basic and low phosphorus, are delivered Cleveland. Freight rates: 50c. from local furnaces; \$3 from Jackson, Ohio; \$6 from Birmingham.

Coke.—The present price of \$8, Painesville, or \$9.01, delivered Cleveland, has been re-established for Ohio by-product foundry coke for April shipment. Prices of Connellsville foundry coke are unchanged at \$3.75 to \$5.10, ovens. The demand shows some gain over the previous few weeks.

Fluorspar.—Some small-lot sales of gravel fluorspar are being made at \$15, mines, but at least one producer is still on a \$14.50 basis. There is talk of an advance to \$16.

Cold Finished Steel Bars.—Since the establishment of 2.25c., Cleveland, or 2.20c., Pittsburgh, as the second quarter price, most consumers have either placed second quarter contracts or have arranged to carry over through the next quarter contracts placed for this quarter at the same price. Specifications are only fair.

Bolts, Nuts and Rivets.—Specifications for bolts and nuts are showing a little gain this month over February, and makers are operating their plants at about 65 per cent of capacity. Some contracts are being taken for the second quarter. The \$3 a ton advance on rivets for the second quarter was expected to stimulate orders against first quarter contracts, but so far there has been little gain.

Iron Ore.—There is an expectation that Lake Superior ore prices for the season will be named before the end of the month. The inquiry of the Ford Motor Co. for 440,000 tons is the only one so far in the market, and it seems probable that the prices will be established on the Ford business, on which sellers have not yet put in bids. It is generally expected that last season's prices will be re-established. Sellers look for a movement in 1928 of about the same volume as last year when Lake and rail shipments amounted to 52,344,099 tons. Stocks at furnaces and on Lake Erie docks May 1 will be about 1,000,000 tons less than on the same date a year ago. These stocks on March 1 amounted to 29,002,800 tons, compared with 29,808,552 tons on March 1, last year. The amount at furnaces on March 1 was 23,015,392 tons. Consumption of Lake ore during February amounted to 4,394,931 tons, a gain of 91,779 tons over January. Central district furnaces during the month consumed 2,135,684 tons, a gain of 71,813 tons. Lake front furnaces used 2,084,656 tons, a gain of 24,194 tons. Eastern furnaces melted 58,984 tons, a gain of 14,542 tons, and all-rail furnaces used 115,607 tons, a decrease of 18,748 tons. On Feb. 29 there were 159 furnaces using Lake ore in blast, a gain of three for the month.

Semi-Finished Steel.—In the hope of getting somewhat better prices, the local producer is still holding off in naming second quarter quotations and has made reservations for that delivery for some of the large consumers subject to the fixing of prices later. Specifications are fairly heavy.

Sheets.—Irregularities have developed on black sheets for prompt shipment in both the Cleveland and Detroit territories. A quotation of 2.75c., Pittsburgh, is reported in the latter market. While mills have taken quite a few second quarter contracts at 2.90c., there is considerable hesitation among consumers about placing contracts for any grade. Galvanized sheets are still offered at 3.75c., Ohio mill. Blue annealed and auto body sheets appear to be firm. Extensions of present 2.90c. contracts for tin mill black plate through the second quarter are reported. New demand is slow, but specifications against contracts from the automotive industry are heavy. Recent buying by this industry has not been in lots of sufficient size to test the market, although the business that has been placed in

Warehouse Prices, f.o.b. Cleveland

Base per Lb.

Plates and structural shapes.....	3.00c.
Soft steel bars.....	3.00c.
Reinforcing steel bars.....	2.25c. to 2.75c.
Cold-finished rounds and hexagons.....	3.65c.
Cold-finished flats and squares.....	4.15c.
Hoops and bands.....	3.65c.
Cold-finished strip.....	5.95c.
Black sheets (No. 24).....	3.75c.
Galvanized sheets (No. 24).....	4.40c. to 4.60c.
Blue annealed sheets (No. 10).....	3.25c.
No. 9 annealed wire, per 100 lb.....	\$2.90
No. 9 galvanized wire, per 100 lb.....	3.35
Common wire nails, base per keg.....	2.90

*Net base, including boxing and cutting to length.

auto body sheets is understood to have gone at regular prices.

Strip Steel.—Consumers are freely specifying against old low-priced contracts for both hot and cold-rolled strip. While some second quarter contracts have been placed at the currently quoted prices, they have not been for large lots, as considerable hesitation is being shown among consumers in placing contracts and the test of the market is yet to come.

Reinforcing Bars.—Inquiry is light. Some rail steel mills have advanced prices \$1 a ton to 1.80c., mill. Billet steel bars are unchanged at 1.80c. to 1.85c., Cleveland.

Warehouse Business.—While jobbers' sales are fair, they are not holding up in volume to last month. Prices are being well maintained.

Old Material.—There is no new consumer demand and dealers are still covered against contracts. Consequently the market is almost at a standstill. Mills continue to regulate shipments and are not taking much scrap. Some are evidently reducing their scrap inventories because of the approach of the Ohio tax return day, April 8. The supply of scrap is in excess of the demand and the market has a weak tone. Quotations are unchanged, but in the absence of transactions are nominal.

Prices per gross ton, delivered consumers' yards:
Basic Open-Hearth Grades

No. 1 heavy melting steel.....	\$13.75 to \$14.00
No. 2 heavy melting steel.....	13.25 to 13.50
Compressed sheet steel.....	12.75 to 13.00
Light bundled sheet stampings...	11.50 to 11.75
Drop forge flashings.....	12.50 to 13.00
Machine shop turnings.....	9.00 to 9.25
No. 1 railroad wrought.....	11.50 to 12.00
No. 2 railroad wrought.....	13.50 to 14.00
No. 1 busheling.....	11.00 to 11.25
Pipes and flues.....	9.00 to 9.50
Steel axle turnings.....	12.50 to 13.00

Acid Open-Hearth Grades

Low phosphorus forging crops...	16.50 to 17.00
Low phosphorus, billet, bloom and slab crops.....	17.00 to 17.50
Low phosphorus sheet bar crops...	16.50 to 17.00
Low phosphorus plate scrap.....	16.00 to 16.50

Blast Furnace Grades

Cast iron borings.....	10.00 to 10.25
Mixed borings and short turnings	10.00 to 10.25
No. 2 busheling.....	10.00 to 10.25

Cupola Grades

No. 1 cast.....	16.50 to 17.00
Railroad grate bars.....	11.00 to 12.00
Stove plate.....	12.00 to 12.50
Rails under 3 ft.....	18.00 to 18.50

Miscellaneous

Railroad malleable.....	15.00 to 15.50
Rails for rolling.....	16.25 to 16.50

New York

Pig Iron Consumers Delaying Purchases—Steel Volume Continues Heavy

NEW YORK, March 20.—Sales of pig iron by local brokers during the week did not exceed 7000 tons. Little new inquiry has appeared in the market, and consumers are showing an increasing inclination to delay purchases on the possibility that they may obtain better prices later. A Port Chester, N. Y., plant, which was in the market for 2000 tons of foundry iron, has postponed buying. The Foran Foundry & Mfg. Co., Flemington, N. J., is about to close on 400 tons of No. 2 and 500 tons of No. 2X foundry iron. The General Electric Co., Schenectady, N. Y., has entered the market for a total of 2500 tons of various grades of foundry iron for shipment as follows: 600 tons to Bayway, N. J.; 500 tons to Lynn, Mass., 400 tons to Everett, Mass.; 300 tons to Pittsfield, Mass.; 200 tons to Schenectady, and 500 tons to Erie, Pa. Another inquiry calls for 1000 tons for delivery during the second quarter. The New York Central Railroad is inquiring for 300 tons of foundry iron for delivery at Frankfort, N. Y., or Elkhart, Ind., and the Delaware, Lackawanna & Western Railroad has purchased 50 tons of foundry grade. About 1500 tons of foundry iron bought by the Westinghouse Electric & Mfg. Co. for Springfield, Mass., is understood to have been placed with a Buffalo producer at \$16 per ton, Buffalo, for No. 2X and \$16.50 for No. 1X. Economies in freight rates through the use of barge shipments are

still receiving careful consideration by Buffalo producers. At a meeting of shippers and barge operators in New York last week no material progress toward establishing maximum and minimum rates for canal shipment was made. Operators wanted a minimum rate of \$2.75 per ton from Buffalo to Jersey City docks, but producers contended that this is too high to permit competitive selling. Previous reports to the contrary, it is said that no Buffalo iron has been sold this year for through barge shipment to Delaware River points, although barge-and-rail contracts with eastern Pennsylvania consumers have been made.

Prices per gross ton, delivered New York district:

Buffalo No. 2 fdy., sil. 1.75 to 2.25	\$21.41 to \$21.91
East. Pa. No. 2 fdy., sil. 1.75 to 2.25	20.39 to 22.52
East. Pa. No. 2X fdy., sil. 2.25 to 2.75	20.89 to 23.02
East. Pa. No. 1X fdy., sil. 2.75 to 3.25	21.39 to 23.52

Freight rates: \$4.91 from Buffalo, \$1.39 to \$2.52 from eastern Pennsylvania.

Warehouse Prices, f.o.b. New York

	Base per Lb.
Plates and structural shapes.....	3.34c.
Soft steel bars and small shapes.....	3.24c.
Iron bars.....	3.24c.
Iron bars, Swedish charcoal.....	7.00c. to 7.25c.
Cold-finished shafting and screw stock—	
Rounds and hexagons.....	3.40c.
Flats and squares.....	3.90c.
Cold-rolled strip, soft and quarter hard,	
5.15c. to 5.40c.	
Hoops.....	4.49c.
Bands.....	3.99c.
Blue annealed sheets (No. 10 gage),	
3.84c. to 3.89c.	
Long terne sheets (No. 24).....	5.80c.
Standard tool steel.....	12.00c.
Wire, black annealed.....	4.50c.
Wire, galvanized annealed.....	5.15c.
Tire steel, 1½ x ½ in. and larger.....	3.30c.
Smooth finish, 1 to 2½ x ¼ in. and larger	3.65c.
Open-hearth spring steel, bases.....	4.50c. to 7.00c.
Machine bolts, cut thread: Per Cent Off List	
¾ x 6 in. and smaller.....	55 to 60
1 x 30 in. and smaller.....	50 to 50 and 10
Carriage bolts, cut thread:	
¾ x 6 in. and smaller.....	55 to 60
¾ x 20 in. and smaller.....	50 to 50 and 10
Coach screws:	
¾ x 6 in. and smaller.....	55 to 60
1 x 16 in. and smaller.....	50 to 50 and 10
Boiler Tubes— Per 100 Ft.	
Lap welded steel, 2-in.....	\$17.33
Seamless steel, 2-in.....	20.24
Charcoal iron, 2-in.....	25.00
Charcoal iron, 4-in.....	67.00

Discounts on Welded Pipe

Standard Steel—	Black	Galv.
½-in. butt.....	46	29
¾-in. butt.....	51	37
1-3-in. butt.....	53	39
2½-6-in. lap.....	48	35
7 and 8-in. lap.....	44	17
11 and 12-in. lap.....	37	12

Wrought Iron—

½-in. butt.....	5	+19
¾-in. butt.....	11	+9
1-1½-in. butt.....	14	+6
2-in. lap.....	5	+14
3-6-in. lap.....	11	+6
7-12-in. lap.....	3	+16

Tin Plate (14 x 20 in.)

	Prime	Seconds
Coke, 100 lb. base box.....	\$6.45	\$6.20
Charcoal, per box—	A	AAA
IC.....	\$9.70	\$12.10
IX.....	12.00	14.25
IXX.....	13.90	16.00

Terne Plate (14 x 20 in.)

IC—20-lb. coating.....	\$10.00 to \$11.00
IC—30-lb. coating.....	12.00 to 13.00
IC—40-lb. coating.....	13.75 to 14.25

Sheets Box Annealed—Black, C. R. One Pass

	Per Lb.
Nos. 18 to 20.....	3.80c. to 4.00c.
No. 22.....	3.95c. to 4.15c.
No. 24.....	4.00c. to 4.20c.
No. 26.....	4.10c. to 4.30c.
No. 28*.....	4.25c. to 4.45c.
No. 30.....	4.50c. to 4.70c.

Sheets, Galvanized

	Per Lb.
No. 14.....	4.35c.
No. 16.....	4.45c.
No. 18.....	4.35c. to 4.60c.
No. 20.....	4.50c. to 4.75c.
No. 22.....	4.55c. to 4.80c.
No. 24.....	4.70c. to 4.95c.
No. 26.....	4.95c. to 5.20c.
No. 28*.....	5.20c. to 5.45c.
No. 30.....	5.60c. to 5.85c.

*No. 28 and lighter, 36 in. wide, 20c. higher per 100 lb.

Warehouse Business.—Most jobbers are maintaining the present price schedule on products from stock. Concessions are infrequent. Discounts on bolts and screws are being maintained, with only occasional increases in the usual discount. Blue annealed sheet prices continue fairly firm, but concessions of not more than \$1 a ton are still obtainable on desirable purchases. There is a good movement of structural material from warehouse and March is expected by most jobbers to prove the best month thus far this year.

Mill prices per lb., delivered New York: Soft steel bars, 2.19c. to 2.24c.; plates, 2.17½c. to 2.22½c.; structural shapes, 2.14½c. to 2.19½c.; bar iron, 2.14c.

Finished Steel.—Contract buyers of plates, shapes and bars have generally been covered for second quarter at 1.85c., Pittsburgh, for bars, at 2c., Coatesville, for plates, and at 2c., Bethlehem, for structural shapes. Some consumers who will be able to specify enough tonnage against first quarter contracts to carry them through April or beyond have preferred not to contract for the next quarter, evidently believing that the upward movement of prices has reached its peak for the present and that nothing is to be gained by covering. In sheets, strip steel and wire products there has been less second quarter coverage than in plates, shapes and bars. Some sheet buyers object to paying the higher prices asked for black and galvanized sheets for the next quarter and contracting is slow. Jobbers of wire nails are loaded up so heavily with stocks that some halting in the demand for that product is in evidence. The volume of specifications against first quarter contracts is well up to the recent levels and is quite satisfactory. Some mills insisted on customers specifying their March quotas by the 15th, but the majority will accept shipping orders up to the end of the month. This means that considerable of the lower-priced tonnage will not be shipped until late in April. Eastern mills are operating at 70 to 80 per cent. Structural steel lettings in this district during the week were light. Among pending inquiries is 7700 tons for a section of the subway in Brooklyn.

Cast Iron Pipe.—Prices continue to show greater firmness, most makers having sufficient business on order to carry them through the next four or five weeks. One Northern maker is still quoting prices which Birmingham foundries are declining to meet, and imported pipe has been sold on a basis of about \$28 per net ton, Birmingham. Inquiries are in most cases for lots of less than 100 tons for small municipalities and private users. Madison, N. J., has purchased 56 tons of 6-in. water pipe from B. Nicoll & Co., New York. At the opening of bids March 14 by the Department of Purchase, New York, on 5355 tons of pipe, R. D. Wood & Co. were low bidders on 3280 tons of 8-in. and 1830 tons of 12-in. pipe and about 3000 tons of fittings. The United States Cast Iron Pipe & Foundry Co. was low on 245 tons of 6-in. pipe.

Prices per net ton, delivered New York: Water pipe 6-in. and larger, \$37.25 to \$38.25; 4-in. and 5-in., \$42.25 to \$43.25; 3-in., \$52.25 to \$53.25; Class A and gas pipe, \$4 to \$5 extra.

Reinforcing Bars.—Several hundred tons of bars are involved in a number of road jobs for the State of New Jersey, some of which are likely to be closed this week. Another sizable tonnage will be required for two additional sections of the subway in New York, on which general contract bids are to be taken later in the month. Awards have not been plentiful during the last week. Although distributors are generally quoting 2c., Pittsburgh, at least one large contract closed recently went at a considerably lower figure. Warehouse prices are unchanged.

Coke.—There is some renewal of expiring contracts for both furnace and foundry coke, but in a few instances consumers are evidently intending to purchase in the open market until the beginning of the second half. Connellsville furnace coke is quoted at \$2.75 to \$3 per ton, Connellsville. Delivered prices in this district of special brands of beehive foundry coke are: To northern New Jersey, Jersey City and Newark, \$8.71 to \$8.81 per net ton; to New York and Brooklyn, \$9.59 to \$9.69 per net ton. By-product coke is quoted at \$9 to \$9.40 per ton, Newark or Jersey City, and \$10.09 to \$10.95, New York or Brooklyn.

Old Material.—Prices of most grades are unchanged, but the market as a whole does not show much strength. Brokers are offering \$10.50 per ton or less for yard grade of heavy melting steel, delivered to eastern Pennsylvania consumers. Machine shop turnings are still being purchased for \$10.25 to \$10.50 per ton, delivered, but it is noteworthy that one consumer of turnings in eastern Pennsylvania is offering only \$10 per ton, delivered, and another user is not accepting shipments. Stove plate prices have also receded for eastern Pennsylvania delivery, brokers offering only \$11 to \$11.50 per ton, delivered, about 50c. a ton less than a week ago.

Dealers' buying prices per gross ton f.o.b. New York:

No. 1 heavy melting steel.....	\$10.00 to \$10.85
Heavy melting steel (yard).....	7.00 to 7.25
No. 1 heavy breakable cast.....	11.25 to 12.00
Stove plate (steel works).....	8.50 to 9.00
Locomotive grate bars.....	8.75 to 9.00
Machine shop turnings.....	6.75 to 7.50
Short shoveling turnings.....	7.00 to 7.50
Cast borings (blast furnace or steel works).....	6.75 to 7.50
Mixed borings and turnings.....	7.00 to 7.50
Steel car axles.....	16.00 to 16.50
Iron car axles.....	23.75 to 24.75
Iron and steel pipe (1 in. dia., not under 2 ft. long).....	8.75
Forge fire.....	6.75 to 7.00
No. 1 railroad wrought.....	10.50 to 11.00
No. 1 yard wrought, long.....	9.00 to 9.50
Rails for rolling.....	10.50 to 11.00
Cast iron carwheels.....	11.25 to 11.75
Stove plate (foundry).....	8.50 to 9.00
Malleable cast (railroad).....	10.00 to 10.50
Cast borings (chemical).....	11.00 to 11.50

Prices per gross ton, delivered local foundries:

No. 1 machinery cast.....	\$13.75 to \$14.25
No. 1 heavy cast (columns, building materials, etc.), cupola size.....	11.75 to 12.25
No. 2 cast (radiators, cast boilers, etc.).....	11.25 to 11.75

High Rate of Sales and Production of Steel Castings Continues

WASHINGTON, March 20.—Orders for commercial steel castings in February totaled 90,059 tons, representing 62 per cent of the capacity of the 129 reporting firms, against 91,069 tons or 63 per cent of capacity in January, according to the Department of Commerce. The reporting producers have a total monthly capacity of 145,600 tons, or more than 80 per cent of the commercial castings capacity of the United States. Production in February amounted to 86,626 tons, or 60 per cent of capacity, against 74,079 tons in January, or 51 per cent of capacity.

Of the new orders in February, 41,096 tons was for railroad specialties, being 61 per cent of this class of capacity, compared with 41,276 tons in January. Orders for miscellaneous castings in February totaled 48,963 tons, or 63 per cent of this kind of capacity, against 49,793 tons in January.

Casting produced for railroad specialties in February aggregated 37,719 tons, or 56 per cent of this kind of capacity, against 28,714 tons in January. Output of miscellaneous castings totaled 48,907 tons, or 63 per cent of this class of capacity in February, against 45,365 tons in January.

Except for January, the February orders were the largest since last June, when the total was 90,898 tons. Production in February was the largest since last August, with 87,004 tons.



New Management Proposed for N. & G. Taylor Co.

Following consultation with a number of its larger creditors, the N. & G. Taylor Co., Philadelphia, tin plate manufacturer, has requested an extension of time for payment of the claims of its creditors. The president of the company, H. N. Taylor, has agreed to cause a new management to be elected to conduct the affairs of the company and a meeting with the larger creditors is scheduled for this week, at which the creditors are expected to appoint a representative.

The company points out that economies of operation have been put into effect during the past few months and that business as a result has recently been profitable.

San Francisco

Car Company Buys 5000 Tons of Shapes and Plates—Outlook Good

SAN FRANCISCO, March 17 (*By Air Mail*).—Activity in the Pacific Coast markets fell off somewhat this week, but the trade is encouraged over the fact that considerable new work is in sight. Important lettings included 5000 tons of small shapes and universal plates for the Pacific Car & Foundry Co., Seattle, placed with the Pacific Coast Steel Co., 2000 tons of plates for the Seattle penstock, booked by the Puget Sound Machinery Depot, and 3100 tons of cast iron pipe for Southgate, Cal., awarded to Leo Vuksich.

The price structure in most lines is holding well to the established levels, but fabricated and erected prices on structural steel are decidedly weak in the San Francisco district.

Pig Iron.—Demand for foundry pig iron remains quiet, the majority of both sales and inquiries involving small lots. Another shipment of Indian iron has arrived on the Coast. Of this, 400 tons was unloaded at Los Angeles, 600 tons at San Francisco and the remainder was reshipped to north Pacific ports. The next shipment, 850 tons, is due about April 1. No change in prices is noted.

Prices per gross ton at San Francisco:

*Utah basic	.....	\$25.00 to \$26.00
*Utah foundry, sil.	2.75 to 3.25	25.00 to 26.00
**Indian foundry, sil.	2.75 to 3.25	24.00 to 25.00
**German foundry, sil.	2.75 to 3.25	24.25

*Delivered San Francisco.

**Duty paid, f.o.b. cars San Francisco.

Shapes.—The Pacific Coast Engineering Co. took 370 tons for a plant in South San Francisco for the Edwards Wire Co. Demand for plain material continues strong and pending business exceeds 13,000 tons. Bids have been received on 4000 tons for the Capewell Store in Oakland, on 3000 tons for the Coyote Point bridge, San Francisco, and on 450 tons for a hotel in San Francisco. Plain material continues firm at 2.35c. c.i.f.

Plates.—Two important awards were noted this week. In addition to the 2000-ton penstock at Seattle, reported above, the Traylor Engineering Co. took 600 tons for kilns for the Pacific Coast Cement Co. at Seattle. Plate fabricators have figured the tonnage involved in the aqueducts in Oakland for the East Bay Municipal District, bids on which go in April 20. The Wildcat aqueduct will require 4830 tons for 56 and 60-in. pipe and the Sequoia aqueduct will take 3668 tons for 50, 56 and 60-in. pipe. All the material will be 7/16 in. Bids will be taken April 10 for 445 tons for siphons for the Kittitas Canal in Washington. Prices are firm at 2.30c. c.i.f.

Bars.—Reinforcing steel bookings were confined, with one exception, to lots of less than 100 tons. A subway in Los Angeles, involving 475 tons, was placed with an unnamed interest. Bids have been opened on 1000 tons for the Panama Canal Zone. Bids on 5257 tons for the Drainage Improvement District No. 23, Los Angeles, were returned unopened and new bids will be taken April 2. Pending business calls for more than 14,000 tons. Prices in the Bay district remain weak because of foreign competition, and 2.25c. on out-of-stock material continues to be quoted in a number of instances.

Cast Iron Pipe.—The largest cast iron pipe award so far this year was 3096 tons of 4 to 12-in. class B

Warehouse Prices, f.o.b. San Francisco

	Base per Lb.
Plates and structural shapes	..... 3.15c.
Soft steel bars	..... 3.15c.
Small angles, $\frac{3}{8}$ -in. and over	..... 3.15c.
Small angles, under $\frac{3}{8}$ -in.	..... 3.55c.
Small channels and tees, $\frac{3}{4}$ -in. to 2 $\frac{3}{4}$ -in.	..... 3.75c.
Spring steel, $\frac{1}{4}$ -in. and thicker	..... 5.00c.
Black sheets (No. 24)	..... 4.95c.
Blue annealed sheets (No. 10)	..... 3.90c.
Galvanized sheets (No. 24)	..... 5.50c.
Structural rivets, $\frac{1}{2}$ -in. and larger	..... 5.65c.
Common wire nails, base per keg	..... \$3.40
Cement coated nails, 100-lb. keg	..... 3.40

pipe for Southgate, Cal., the general contract going to Leo Vuksich, Los Angeles. Two San Diego street improvement jobs of 110 tons of 4 to 8-in. class B pipe for Whitman Street and 271 tons of 2 to 10-in. class C for Twenty-eighth Street, were placed with unnamed interests. Corrected estimates of the quantity involved in the East Bay Municipal Utility District aqueducts in Oakland, Cal., show 17,440 tons of 56 and 60-in. class C pipe for the Wildcat aqueduct and 13,250 tons of 50, 56 and 60-in. class C pipe for the Sequoia aqueduct. This brings the total to 30,690 tons instead of 25,000 tons, as reported in THE IRON AGE last week. Bids on this project will be opened April 20. All bids on 663 tons of 6 to 20-in. classes B and C pipe for Santa Barbara, Cal., were rejected and new bids will be taken March 22. Red Bluff, Cal., will open bids on March 26 for 114 tons of 6 and 10-in. class B or centrifugal pipe. Armona, Cal., rejected all bids on 222 tons of 4 to 8-in. class B pipe and has purchased standard pipe.

Steel Pipe.—The only award reported this week was 100 tons of 6 and 8-in. lapweld pipe for Municipal District No. 3, Monrovia, Cal., which was placed with the Santa Fe Pipe & Supply Co., Los Angeles. The Grinnell Co. was low bidder at 89c. per ft. for 25,000 ft. or 360 tons of 8-in. seamless pipe for Los Angeles. Bids will be opened on March 19 for 510 tons of 4 and 6-in. seamless pipe for Brighthouse, B. C.

Coke.—About 4000 tons of English coke has arrived on the Coast and part of it is now being unloaded at Los Angeles. The rest will be delivered to San Francisco Bay foundries. This market reflects the quiet condition of the pig iron market.

Birmingham

Steel Sales and Inquiries Show Decided Improvement

BIRMINGHAM, March 20.—The pig iron market continues to await second quarter developments. Buying during the week has been in small lots and most of the sales have been to melters who are running short on their first quarter requirements. Very little interest has been shown in second quarter buying and none of the three merchant producers in the district report forward bookings of any consequence. Only a few inquiries are being received. Sales of foundry iron are still on a \$16 base. There were no changes last week in furnace operations, 18 being in blast. Of this number, 10 were on foundry, seven on basic and one on recarburizing iron.

Prices per gross ton, f.o.b. Birmingham district furnaces:

No. 2 foundry, 1.75 to 2.25 sil.	.....\$16.00
No. 1 foundry, 2.25 to 2.75 sil.	..... 16.50
Basic	..... 15.00

Finished Steel.—Sales and inquiries last week showed a decided improvement. Demand has increased and a considerable volume of business is being booked. Prices are unchanged. Structural steel fabricators report a better feeling in the market. Open-hearth operations continue the same as for the past two weeks. The Tennessee company is alternately operating 13 and 14 and the Gulf States Steel Co. four.

Cast Iron Pipe.—A fair amount of tonnage has been placed during the first half of the month, consisting almost entirely of small orders. Inquiries indicate that buyers are taking more interest in second quarter buying, and the last half of the month is expected to be much better than the first half. It is understood that a number of municipalities in the North are shaping their requirements and considerable activity is looked for from that field with the opening of spring. Prices on second quarter deliveries are being quoted at \$29 to \$31. Plants are operating at around a three-fourths capacity rate.

Coke.—Second quarter buying has continued to improve and more tonnage is being booked than for some time. Shipments are at a nominal rate. The Tennessee Coal, Iron & Railroad Co. on March 6 placed in operation its new by-product unit, consisting of 63 Koppers-

Becker ovens. Both spot and contract quotations are still at \$5.

Old Material.—Sales continue low and in small lots. A slight increase in inquiries has been shown and a better demand is expected. Stove plate and No. 1 cast are being quoted at \$14.50. Other prices are the same.

Prices per gross ton, delivered Birmingham district consumers' yards:

Heavy melting steel.....	\$9.50 to \$10.00
Scrap steel rails.....	11.00 to 11.50
Short shoveling turnings.....	8.00 to 8.50
Cast iron borings.....	8.00
Stove plate.....	14.50
Steel axles.....	19.00 to 20.00
Iron axles.....	20.00 to 21.00
No. 1 railroad wrought.....	10.00 to 10.50
Rails for rolling.....	13.00
No. 1 cast.....	14.50
Tramcar wheels.....	12.50 to 13.50
Cast iron carwheels.....	12.00 to 13.00
Cast iron borings, chemical.....	13.50 to 14.00

Boston

Buffalo Furnace Sells 1000 Tons of Pig Iron at Low Prices

BOSTON, March 20.—The outstanding sale of pig iron the past week was one of 400 tons No. 2X and 600 tons No. 1X made by a Buffalo furnace to the Westinghouse Electric & Mfg. Co., Springfield, Mass., deliveries to begin in April and to extend into the third quarter. The No. 2X was sold at approximately \$16 a ton, furnace, and the No. 1X at \$16.50, the lowest prices made this year. Otherwise the pig iron market is devoid of special feature. Current orders range from car lots to 100 tons, mostly car lots, with Buffalo furnaces, other New York State furnaces and the Mystic Iron Works taking 90 per cent of the business. A little Indian iron was sold at \$21.75 to \$22 on dock here, duty paid.

Prices of foundry iron per gross ton, delivered to most New England points:

Buffalo, sil. 1.75 to 2.25.....	\$21.41 to \$21.91
Buffalo, sil. 2.25 to 2.75.....	21.41 to 22.41
East. Penn., sil. 1.75 to 2.25.....	23.15 to 23.65
East. Penn., sil. 2.25 to 2.75.....	23.65 to 24.15
Virginia, sil. 1.75 to 2.25.....	25.71
Virginia, sil. 2.25 to 2.75.....	26.21
Alabama, sil. 1.75 to 2.25.....	22.91 to 24.77
Alabama, sil. 2.25 to 2.75.....	23.41 to 25.27

Freight rates: \$4.91 from Buffalo, \$3.65 from eastern Pennsylvania, \$5.21 all rail from Virginia, \$6.91 to \$8.77 from Alabama.

Pig Iron Imports.—Imports of pig iron at this port during the first half of March were 199 tons of Indian. In the first half of February, this year, 986 tons was received at Boston; in the first half of March, 1926, 4910 tons, and in the first half of March, 1925, 2033 tons. No iron arrived in March, last year.

Coke.—Ovens are still billing out by-product foun-

Warehouse Prices, f.o.b. Boston

	Base per Lb.
Plates.....	3.365c.
Structural shapes—	
Angles and beams.....	3.365c.
Tees.....	3.365c.
Zeos.....	3.465c.
Soft steel bars and small shapes.....	3.265c.
Flats, hot-rolled.....	4.15c.
Reinforcing bars.....	3.265c. to 3.54c.
Iron bars—	
Refined.....	3.265c.
Best refined.....	4.60c.
Norway, rounds.....	6.60c.
Norway, squares and flats.....	7.10c.
Spring steel—	
Open-hearth.....	5.00c. to 10.00c.
Crucible.....	12.00c.
Tire steel.....	4.50c. to 4.75c.
Bands.....	4.015c. to 5.00c.
Hoop steel.....	5.50c. to 6.00c.
Cold rolled steel—	
Rounds and hexagons.....	*3.45c. to 5.45c.
Squares and flats.....	*3.95c. to 6.95c.
Toe calk steel.....	6.90c.
Rivets, structural or boiler.....	4.50c.
	Per Cent Off List
Machine bolts.....	.50 and 5
Carriage bolts.....	.50 and 5
Lag screws.....	.50 and 5
Hot-pressed nuts.....	.50 and 5
Cold-punched nuts.....	.50 and 5
Stove bolts.....	.70 and 10

*Including quantity differentials.

dry coke at \$11.50 a ton, delivered within a \$3.10 freight rate zone. Specifications against contracts continue to come in slowly. Domestic by-product coke sells on a basis of \$8.50 a ton on cars, Everett, Mass.

Reinforcing Bars.—A sizable business in lots of 50 tons or less was closed in the week. Some attractive tonnages in the Providence, R. I., district are expected shortly. Competition is keen, and 2.90c. per lb., base, from stock has been shaded. Mills are holding to 1.90c. to 1.95c. per lb., base Pittsburgh.

Cold-Rolled Strip.—Mills have opened their books for second quarter. No large tonnages are in the market, however, as consumers continue to buy on a hand-to-mouth basis. Mills are holding to 3.30c. per lb., base Worcester, Mass., for 1 to 3 ton lots.

Old Material.—Machine shop turnings are 25c. a ton lower. Prices for other kinds of scrap are practically unchanged from a week ago, but the market appears easier because inside prices are being paid more often than outside prices. Business is spotty and largely in car lots, and embraces all kinds of material except specification pipe and skeleton. The largest turnover the past week was in turnings and borings, with forged flashings and forged scrap second in activity. Brokers are shipping quite a little textile machinery cast into Pennsylvania, paying around \$11.50 a ton on cars, shipping point. Scattered sales of long and short bundled cotton ties at \$6 to \$6.50 on cars, shipping point, are noted, and the Mystic Iron Works is taking sheared pipe and stove plate at \$10 a ton, delivered.

Buying prices per gross ton f.o.b. Boston rate shipping points:

No. 1 heavy melting steel.....	\$9.00 to \$9.10
Scrap T rails.....	8.00 to 8.50
Scrap girder rails.....	7.50 to 8.00
No. 1 railroad wrought.....	10.00 to 10.50
No. 1 yard wrought.....	8.00 to 8.50
Machine shop turnings.....	5.50 to 6.00
Cast iron borings (steel works and rolling mill).....	6.00 to 6.25
Bundled skeleton, long.....	5.50 to 6.00
Forged flashings.....	6.00 to 6.50
Blast furnace borings and turnings.....	5.75 to 6.25
Forge scrap.....	6.00 to 6.50
Shafting.....	13.00 to 13.50
Steel car axles.....	15.00 to 15.50
Wrought pipe (1 in. in diameter, over 2 ft. long).....	7.50 to 8.25
Rails for rolling.....	10.00 to 10.50
Cast iron borings, chemical.....	9.00 to 9.50

Prices per gross ton delivered consumers' yards:

Textile cast.....	\$13.50 to \$14.00
No. 1 machinery cast.....	14.50 to 15.00
No. 2 machinery cast.....	12.50 to 13.00
Stove plate.....	9.50 to 10.00
Railroad malleable.....	13.00 to 13.50

Youngstown

Ingot Output at About 85 Per Cent—Sheets and Bars Most Active Products

YOUNGSTOWN, March 20.—In point of steel ingot production this district has been running very close to physically full capacity this month and there will be surprise if the month's output falls materially below that of the same month last year. The Youngstown Sheet & Tube Co. has put on another blast furnace, one of the Campbell stacks, and now has six of its nine iron-making units in this district in production—three of the four Campbell furnaces, one of the Brier Hill furnaces and the two at Hubbard, Ohio. The Republic Iron & Steel Co. has three of its four Hazelton furnaces in production, while the single furnaces of the Trumbull Steel Co., Warren, Ohio, and of the Sharon Steel Hoop Co., Lowellville, Ohio, are in blast. The Carnegie Steel Co. has four of six Ohio furnaces in Youngstown in production and in the Shenango Valley four of the six units at Sharon and New Castle, Pa., are operating. Thus, 19 of the 27 steel works blast furnaces in the Greater Youngstown area are active, and in view of improvements and enlargements made in recent years in these furnaces, as much iron now is being made as could have been produced in the full number a few years ago.

The Youngstown Sheet & Tube Co. has 20 of its 24 open-hearth furnaces in this district in production. All eight of the steel-making units at Trumbull Steel Co.,

Warren, are active, as are all six of the Sharon Steel Hoop Co. There are 15 open-hearth furnaces in the Republic Iron & Steel Co. group, but two of these were built by the Government during the war and are not yet listed as the property of the company. Of the 13 owned, 12 are melting. The Carnegie Steel Co. is producing steel in this district at approximately 85 per cent of capacity and that is probably a good estimate of the independent production, although the numerical rating indicates a higher output.

The picture is not quite so bright from the angle of finishing mill operations. There is good engagement of sheet rolling capacity, although as with active melting units, the number of active mills is a little misleading as to the actual production, since at only a few plants are the mills being operated the full number of turns possible each week. The week of 5½ days permits the working of 16 turns of 8 hr. each, but with the exception of the companies producing full finished and automobile body sheets, the average is around 13 turns weekly. Bar mill operations are good, and specifications against old orders are sufficient to sustain relatively full operation of the strip mills, but pipe mills are not much more than 60 per cent engaged and the general demand is not even that good. A common complaint is the brevity of the rolling mill schedules. Consumers still take full advantage of mill and railroad efficiency to keep their specifications down to actual requirements and expect the mills to ship promptly on releases.

Invoice prices are not very satisfactory because the mills here, as in other producing centers, found their order books pretty heavy when price advances were made and conditions have not shaped themselves in a way to give the manufacturers much benefit. Average prices for steel bars for this quarter will be slightly higher than for the final quarter of 1927, but advances in sheets and strips since the opening of the year mean little so far in larger net returns, as so much of the business of this quarter was taken late last year when prices were low. Putting prices up is a slow process, when advances are preceded by full coverage of consumers at lower figures. Pipe prices are highly competitive and are not yielding as much profit as a year ago and the showing is further reduced by a smaller demand than existed at this time last year.

Not much activity is noted in pig iron, the Pittsburgh district market for the steel-making grades being practically cut off by the fact that Pittsburgh steel companies have iron for sale at lower delivered prices than can be made by local furnaces. There is only moderate interest in scrap supplies among local melters, and prices tend to weaken. Most recent sales of heavy melting steel were at \$15, but present ideas of consumers are at least 50c. a ton lower. On compressed sheets \$14.50 has been paid, but there are offerings at \$14.25. There is no market here at present for machine shop turnings.

The reason for the ending of the negotiations for a merger of the Inland Steel Co. and the Youngstown Sheet & Tube Co. continues to be the subject of speculation. Officials of the latter company decline to comment on the termination of the negotiations beyond the official statement given out by Mr. Campbell following

his return from the South. No additional information was forthcoming at the special meeting of the stockholders held here last Thursday which voted down the proposed merger.

Cincinnati

Pig Iron Sales Decline—Steel Specifications Hold at Recent Level

CINCINNATI, March 20.—Pig iron buyers are showing little interest in second quarter requirements, and consequently sales in the past week dropped to a low point. In many cases consumers have been slow in releasing shipments on current contracts, so that considerable iron bought in the first two months of the year will not be delivered until April. For this reason no important buying movement is expected in the next 30 days. An Indianapolis melter has closed for 3000 tons of malleable with a Lake producer. A Kokomo, Ind., company is inquiring for 1000 tons of foundry iron for third quarter delivery, while the Louisville & Nashville Railroad is taking bids on 590 tons of foundry and charcoal iron. Northern Ohio furnaces are quoting \$16.75 to \$17, base furnace, and are getting a large share of the business in this territory at those prices. Ironton makers decline to go below \$19, base Ironton, and as a result are booking only meager tonnages. Southern interests are soliciting second quarter orders on a basis of \$16, Birmingham.

Prices per gross ton, delivered Cincinnati:

So. Ohio fdy., sil. 1.75 to 2.25....	\$20.89
So. Ohio malleable	\$20.14 to 20.89
Alabama fdy., sil. 1.75 to 2.25....	19.69
Alabama fdy., sil. 2.25 to 2.75....	20.19
Tennessee fdy., sil. 1.75 to 2.25...	19.69
Southern Ohio silvery, 8 per cent	26.89

Freight rates, \$1.89 from Ironton and Jackson, Ohio; \$3.69 from Birmingham.

Finished Material.—From a tonnage standpoint specifications have held up to the level reached two weeks ago, and releases on current contracts are expected to attain substantial proportions before the end of the first quarter. Consuming industries are operating at a fair rate, but are taking steel only as they need it for immediate use. Small fabricators in this district have a comfortable amount of work ahead of them, but large companies are feeling the absence of major projects. The Louisville & Nashville Railroad has taken bids on about 800 tons of steel for eight bridges. Bars, structural shapes and plates are quoted at 1.90c. to 2c., base Pittsburgh, although there still is a tendency on the part of certain mills to accept attractive orders at 1.85c. In the sheet market, conditions are regarded as favorable. Orders from automobile companies have been heavy and have enabled mills to sustain production on a basis approaching full capacity. The jobbing trade also has been buying consistently, while demand for electrical sheets has been normal. Aside from concessions in galvanized sheets for roofing purposes in the South, prices for second quarter are becoming more firmly established. Blue annealed stock is steady at 2.10c., base Pittsburgh, black at 2.90c. and automobile body sheets at 4.15c. In this territory galvanized sheets are being sold at 3.75c., but shading of from \$2 to \$3 a ton is reported from the South. The American Rolling Mill Co. states that all of its units are operating at 100 per cent of capacity. Common wire nails are quoted at \$2.65 per keg, Ironton or Pittsburgh, and plain wire at \$2.50 per 100 lb., Ironton or Pittsburgh.

Reinforcing Bars.—Makers of new billet bars are asking from 1.90c. to 2c., base Pittsburgh, for second quarter delivery, while rail steel stock is being sold at 1.80c. to 1.85c., base mill.

Warehouse Business.—Sales have been moderate in volume and indications are that business in the first quarter of 1928 will equal that in the same period last year. Bars, structural shapes and plates are the most active commodities at the moment. Prices are steady and unchanged.

Warehouse Prices, f.o.b. Cincinnati

	Base per Lb.
Plates and structural shapes.....	3.40c.
Bars, soft steel or iron.....	3.30c.
New billet reinforcing bars.....	3.15c.
Rail steel reinforcing bars.....	3.00c.
Hoops	4.00c. to 4.25c.
Bands	3.95c.
Cold-finished rounds and hexagons.....	3.85c.
Squares	4.35c.
Black sheets (No. 24).....	4.05c.
Galvanized sheets (No. 24).....	4.90c.
Blue annealed sheets (No. 10).....	3.60c.
Structural rivets	3.85c.
Small rivets .....	.65 per cent off list
No. 9 annealed wire, per 100 lb.....	\$3.00
Common wire nails, base per keg.....	2.95
Cement coated nails, base 100 lb. keg.....	2.95
Chain, per 100 lb.....	7.55
	Net per 100 Ft.
Lap-welded steel boiler tubes, 2-in.....	\$18.00
4-in.	38.00
Seamless steel boiler tubes, 2-in.....	19.00
4-in.	39.00

Coke.—Shipments of by-product foundry coke from ovens at Indianapolis, Portsmouth and Ironton have been holding up well, and the total volume in March promises to be the best in many months. While foundries supplying the automobile trade are taking most of the tonnage, demand from jobbing foundries also has been good. Movement of beehive foundry coke from the Wise County and New River districts has been comparatively light in the last two weeks. Prices are unchanged.

Foundry coke prices per net ton, delivered Cincinnati: By-product coke, \$9.52 to \$9.64; Wise County coke, \$7.59 to \$8.09; New River coke, \$10.09 to \$10.59. Freight rates, \$2.14 from Ashland, Ky.; \$2.59 from Wise County and New River ovens.

Old Material.—The scrap market is listless. Steel plants are doing practically no forward buying, although releases on present contracts have been about normal. Blast furnace grades are quiet. Railroad lists closing last week are reported to have brought prices only slightly under those in February.

Dealers' buying prices per gross ton f.o.b. cars, Cincinnati:

Heavy melting steel.....	\$11.00 to \$11.50
Scrap rails for melting.....	11.75 to 12.25
Loose sheet clippings.....	8.50 to 9.00
Bundled sheets.....	9.50 to 10.00
Cast iron borings.....	8.00 to 8.50
Machine shop turnings.....	7.50 to 8.00
No. 1 busheling.....	10.00 to 10.50
No. 2 busheling.....	7.00 to 7.50
Rails for rolling.....	12.50 to 13.00
No. 1 locomotive tires.....	12.75 to 13.25
No. 1 railroad wrought.....	10.50 to 11.00
Short rails.....	16.00 to 16.50
Cast iron carwheels.....	12.25 to 12.75
No. 1 machinery cast.....	15.50 to 16.00
No. 1 railroad cast.....	13.00 to 13.50
Burnt cast.....	7.50 to 8.00
Stove plate.....	8.25 to 8.75
Brake shoes.....	9.50 to 10.25
Railroad malleable.....	12.25 to 12.75
Agricultural malleable.....	11.75 to 12.25

St. Louis

Bridge Approach Requires 6000 Tons of Steel—Pig Iron Quiet

ST. LOUIS, March 20.—The pig iron market continues quiet. Considerable iron is yet to be bought for second quarter delivery, and this demand is expected to come soon. The melt in this district is keeping up well. The Granite City maker's sales totaled 3000 tons, all foundry grades, including 1000 tons to a specialty maker, several lots of 300 tons each to stove foundries. A leading Southern interest sold 400 tons, and has inquiries for an additional 300 tons. Prices are unchanged.

Prices per gross ton at St. Louis:

No. 2 fdy., sil. 1.75 to 2.25 f.o.b.	
Granite City, Ill.....	\$19.50 to \$20.00
Northern No. 2 fdy., delivered	
St. Louis.....	20.66
Southern No. 2 fdy., delivered...	20.42
Northern malleable, delivered...	20.66
Northern basic, delivered.....	20.66

Freight rates: 81c. from Granite City to St. Louis; \$2.16 from Chicago; \$4.42 from Birmingham.

Warehouse Prices, f.o.b. St. Louis

	Base per Lb
Plates and structural shapes.....	3.25c.
Bars, soft steel or iron.....	3.15c.
Cold-finished rounds, shafting and screw stock.....	3.75c.
Black sheets (No. 24).....	4.45c.
Galvanized sheets (No. 24).....	5.25c.
Blue annealed sheets (No. 10).....	3.60c.
Black corrugated sheets (No. 24).....	4.50c.
Galvanized corrugated sheets.....	5.30c.
Structural rivets.....	3.75c.
Boiler rivets.....	3.75c.
	Per Cent Off List
Tank rivets, $\frac{1}{8}$ -in. and smaller, 100 lb. or more.....	70
Less than 100 lb.....	65
Machine bolts.....	60
Carriage bolts.....	60
Lag screws.....	60
Hot-pressed nuts, square, blank or tapped, 200 lb. or more.....	60
Less than 200 lb.....	50
Hot-pressed nuts, hexagons, blank or tapped, 200 lb. or more.....	60
Less than 200 lb.....	50

Finished Iron and Steel.—Bids will be received April 15 by the Board of Public Service for 6000 tons of structural steel to be used in the southern approach to the municipal bridge across the Mississippi River. About 5000 ft. of double track will be built, but bids for the rails will not be asked for until fall. Lettings of the structural steel and reinforcing bars for the embankment and foundation for the bridge has been reported in THE IRON AGE. The Manufacturers Railway of St. Louis bought 490 tons of steel for car repair work from the Illinois Steel Co. Renewed activity is reported in the oil fields, but it has not yet affected the demand for steel. Warehouse business is better, but the improvement is coming only from the St. Louis industrial district.

Coke.—Another spell of cold weather has helped the demand for domestic grades of coke. Buying of industrial grades continues active, although consumers are covering only as their needs arise.

Old Material.—The old material market continues weak because consumers have sufficient material on hand or contracted for to last at least another month, and it is not likely they will buy until then. Dealers are buying only to cover orders. No. 1 locomotive tires, miscellaneous standard section rails, etc., and machine shop turnings are 50c. a ton lower; the remainder of the list is unchanged. Railroad lists include: Southern Railway, 7300 tons; International-Great Northern, 3000 tons; Wabash, 251 tons; Rock Island, 175 carloads; Frisco Lines, 17 carloads, and Chicago, Burlington & Quincy, 15 miles of 60 to 70 lb. relaying rails.

Prices per gross ton, f.o.b. dealers' yards and delivered St. Louis district consumers' works:

Heavy melting steel.....	\$11.50 to \$12.00
No. 1 locomotive tires.....	12.25 to 12.75
Heavy shovelling steel.....	11.50 to 12.00
Miscellaneous standard-section rails, including frogs, switches and guards, cut apart.....	13.00 to 13.50
Railroad springs.....	14.25 to 14.75
Bundled sheets.....	8.75 to 9.25
No. 2 railroad wrought.....	11.50 to 12.00
No. 1 busheling.....	9.75 to 10.25
Cast iron borings.....	9.00 to 9.50
Iron rails.....	13.00 to 13.50
Rails for rolling.....	13.75 to 14.25
Machine shop turnings.....	7.00 to 7.50
Steel car axles.....	18.50 to 19.00
Iron car axles.....	23.50 to 24.00
Wrought iron bars and transoms.....	21.00 to 21.50
No. 1 railroad wrought.....	10.00 to 10.50
Steel rails, less than 3 ft.....	15.00 to 15.50
Steel angle bars.....	12.00 to 12.50
Cast iron carwheels.....	13.50 to 14.00
No. 1 machinery cast.....	14.00 to 14.50
Railroad malleable.....	11.00 to 11.50
No. 1 railroad cast.....	13.50 to 14.00
Stove plate.....	13.00 to 13.50
Agricultural malleable.....	12.00 to 12.50
Relaying rails, 60 lb. and under.....	20.50 to 23.50
Relaying rails, 70 lb. and over.....	26.50 to 29.00

Buffalo

Pig Iron Fairly Active—Steel Output at 80 to 85 Per Cent

BUFFALO, March 20.—A Buffalo pig iron maker reports taking an order of 2000 to 3000 tons of foundry from a New York State consumer. The General Electric Co. is in the market for 2900 tons of foundry iron for its plants. The Consolidated Machine Tool Co., Rochester, is inquiring for 650 tons of malleable iron for its Delaware plant. A Scranton, Pa., order was for about 1000 tons of foundry. Two Erie consumers bought, the tonnage running from 300 to 500 tons of foundry iron in each case. Quotations are firm at \$17

Warehouse Prices, f.o.b. Buffalo

	Base per Lb.
Plates and structural shapes.....	3.40c.
Soft steel bars.....	3.30c.
Reinforcing bars.....	2.75c.
Cold-finished flats, squares and hexagons.....	4.45c.
Rounds.....	3.95c.
Cold-rolled strip steel.....	5.85c.
Black sheets (No. 24).....	4.30c.
Galvanized sheets (No. 24).....	5.15c.
Blue annealed sheets (No. 10).....	3.80c.
Common wire nails, base per keg.....	\$3.65
Black wire, base per 100 lb.....	3.90

in the district, with one maker quoting below this on New England delivery.

Prices per gross ton, f.o.b. furnace:

No. 2 plain fdy., sil. 1.75 to 2.25.....	\$17.00
No. 2 foundry, sil. 2.25 to 2.75.....	17.50
No. 1X foundry, sil. 2.75 to 3.25.....	18.50
Malleable, sil. up to 2.25.....	\$17.00 to 17.50
Basic.....	16.50 to 17.00
Lake Superior charcoal.....	27.28

Finished Iron and Steel.—Mill operation is around 80 to 85 per cent of capacity on bars, shapes and sheets. Sheet business is good, with the automobile companies specifying freely. The price is unchanged at 2.90c. per lb. for black and 4.15c. for automobile body sheets. Bolt and nut demand is fair, with business being placed for second quarter at the same discounts as for first quarter. A Rochester garage will require 200 tons of reinforcing bars and a new Buffalo terminal for the C. & B. Steamship Line is expected to come out within a week.

Old Material.—The market has been very quiet during the past week. The only purchasing noted has been among dealers. None of the mills or other large consumers has been in the market. Steel mills are operating just as heavily as they have been for the past two weeks and consumption of scrap has been large.

Prices per gross ton, f.o.b. Buffalo consumers' plants:

Basic Open-Hearth Grades	
No. 1 heavy melting steel.....	\$14.75 to \$15.25
No. 2 heavy melting steel.....	13.00 to 13.50
Scrap rails.....	13.75 to 14.25
Hydraulic compressed sheets.....	13.25 to 13.75
Hand bundled sheets.....	9.00 to 9.50
Drop forge flashings.....	12.00 to 12.50
No. 1 busheling.....	13.25 to 13.75
Heavy steel axle turnings.....	12.50 to 12.75
Machine shop turnings.....	8.50 to 9.00
Acid Open-Hearth Grades	
Railroad knuckles and couplers.....	15.50 to 16.00
Railroad coil and leaf springs.....	15.50 to 16.00
Roller steel wheels.....	15.50 to 16.00
Low phosphorus billet and bloom ends.....	17.00 to 17.50
Electric Furnace Grades	
Heavy steel axle turnings.....	12.75 to 13.25
Short shoveling steel turnings.....	10.75 to 11.25
Blast Furnace Grades	
Short shoveling steel turnings.....	10.50 to 11.00
Short mixed borings and turnings.....	9.50 to 10.00
Cast iron borings.....	9.75 to 10.25
No. 2 busheling.....	9.00 to 9.50
Rolling Mill Grades	
Steel car axles.....	17.00 to 17.50
Iron axles.....	22.00 to 23.00
No. 1 railroad wrought.....	12.50 to 13.00
Cupola Grades	
No. 1 machinery cast.....	14.50 to 15.00
Stove plate.....	13.00 to 13.25
Locomotive grate bars.....	11.50 to 12.00
Steel rails, 3 ft. and under.....	17.00 to 17.25
Cast iron carwheels.....	13.00 to 13.50
Malleable Grades	
Railroad.....	15.00 to 15.25
Agricultural.....	15.00 to 15.25
Industrial.....	15.00 to 15.25

Detroit Scrap Market Dull and Prices Unchanged

DETROIT, March 20.—No changes in prices on old material have developed during the past week in this district. The general tone of the market is decidedly weak. There have been few sales of size.

Dealers' buying prices per gross ton, f.o.b. cars, Detroit:

Heavy melting and shoveling steel.....	\$11.00 to \$11.50
Borings and short turnings.....	7.25 to 7.75
Long turnings.....	6.75 to 7.25
No. 1 machinery cast.....	14.00 to 15.00
Automobile cast.....	19.50 to 21.00
Hydraulic compressed sheets.....	9.75 to 10.25
Stove plate.....	11.00 to 12.00
No. 1 busheling.....	8.50 to 9.00
Sheet clippings.....	6.00 to 7.00
Flashings.....	9.25 to 9.75

The Bureau of Standards, Washington, has sent to representative manufacturers a proposed revision of General Specification for Metals, with a view to getting comment before the revision is promulgated.

Canada

Pig Iron Buying at High Level—Scrap Markets More Active

TORONTO, ONT., March 20.—Buying of pig iron in the Canadian markets continues at a high level. Some buyers are delaying purchases as long as possible and are entering the market only when needs make it necessary. This attitude is chiefly due to the fact that they prefer to wait until the opening of Lake and St. Lawrence navigation before placing large tonnage orders; thus they are in a position to obtain the benefits of lower freight charges. Melters who are out of reach of water ports, however, are placing orders for spot delivery. During the past week advance buying has been more general, and it is estimated that about 25 per cent of those who place contracts are now covered for second quarter needs. Inquiries are increasing. While Canadian pig iron makers are doing little price shading, they have strong competition from United States producers and there is little prospect of early advances here.

Prices per gross ton:

Delivered Toronto	
No. 1 foundry, sil. 2.25 to 2.75.....	\$23.60
No. 2 foundry, sil. 1.75 to 2.25.....	23.60
Malleable.....	23.60
Delivered Montreal	
No. 1 foundry, sil. 2.25 to 2.75.....	\$25.00 to \$25.50
No. 2 foundry, sil. 1.75 to 2.25.....	25.00 to 25.50
Malleable.....	25.00 to 25.50
Basic.....	24.00
Imported Iron at Montreal Warehouse	
Summerlee.....	33.50
Carron.....	33.00

Old Material.—The better conditions prevailing among plants using scrap as a raw material have been reflected in more extensive buying in both the Toronto and Montreal districts. Dealers' buying prices are gaining in strength, but not sufficiently so to warrant a revision in quotations.

Dealers' buying prices.

Per Gross Ton		Toronto	Montreal
Heavy melting steel.....	\$9.00	\$8.00	
Rails, scrap.....	10.00	10.00	
No. 1 wrought.....	9.00	11.00	
Machine shop turnings.....	7.00	6.00	
Boiler plate.....	7.00	7.00	
Heavy axle turnings.....	7.50	7.50	
Cast borings.....	7.50	6.00	
Steel turnings.....	7.00	6.50	
Wrought pipe.....	5.00	6.00	
Steel axles.....	14.00	19.00	
Axles, wrought iron.....	16.00	21.00	
No. 1 machinery cast.....		16.00	
Stove plate.....		12.00	
Standard carwheels.....		14.50	
Malleable.....		13.00	
Per Net Ton			
No. 1 machinery cast.....	\$15.00		
Stove plate.....	9.00		
Standard carwheels.....	13.00		
Malleable scrap.....	13.00		

Oppose Increased Rates on Chain Steel and Bolt, Rivet and Nail Rods

WASHINGTON, March 20.—Briefs were filed last week with the Interstate Commerce Commission in connection with the proposal of the railroads in Official Classification territory to increase rates on chain iron and steel, and bolt, rivet and nail-wire rods. The producing steel companies and users of the rods ask the commission to cancel the proposed rates, now under suspension, while the railroads uphold the tariffs. The proceeding involves the question of classification.

The steel producers and users of the rods state that the proposed tariffs would raise the gross billet ratings on rods in coils, in use for 40 years, to finished steel ratings, and in many cases, to fifth class ratings. The new rates, according to the railroads, are based upon the order of the commission in the Standard Nut & Bolt Co. and related cases. The producers and users contend the articles are semi-finished material while the railroads hold they are finished and are subject to the same rates as steel bars, etc.

NON-FERROUS METAL MARKETS

The Week's Prices		Mar. 20	Mar. 19	Mar. 17	Mar. 16	Mar. 15	Mar. 14
	Lake copper, New York.....	14.25	14.25	14.25	14.25	14.25	14.25
	Electrolytic copper, N. Y.*.....	14.00	13.82	13.80	13.80	13.82	14.00
	Straits tin, spot, N. Y.....	52.00	53.00	...	51.80	50.87½	50.50
	Lead, New York.....	6.00	6.00	6.00	6.00	6.00	6.00
	Lead, St. Louis.....	5.80	5.80	5.80	5.80	5.80	5.80
	Zinc, New York.....	6.07½	6.02½	6.00	6.00	6.00	6.02½
	Zinc, St. Louis.....	5.72½	5.67½	5.65	5.65	5.65	5.67½

Cents per Pound
for
Early Delivery

*Refinery quotation; delivered price ¼c. higher.

NEW YORK, March 20.—Tin has been the most active market, with prices advancing sharply. Copper has again turned quiet, with quotations inclined to soften. Conditions in lead are practically unchanged. Demand for zinc is fair and prices are becoming stronger.

Copper.—A tendency toward weakness in electrolytic copper has unexpectedly developed following the strength manifested a week ago. Demand from both foreign and domestic consumers fell off during the week and, as a result, some metal was available at concessions from one or two sources. Practically all large producers still firmly maintain their quotations at 14.12½c., delivered in the Connecticut Valley. In the last week sales have been made at 14.05c. to 14.07c., but the quantity which has changed hands has been small. Yesterday and today a stronger tone has developed and metal below 14.12½c. is very difficult to obtain, if at all. Buying during the week by foreign consumers has been better than by domestic. It is stated that there is a large backlog of metal still to be bought by both foreign and domestic consumers, particularly the former. The official price of Copper Exporters, Inc., is unchanged at 14.50c., c.i.f. European ports. Lake copper is inactive at 14.25c., delivered.

Tin.—With sales of over 3000 tons for the week ended Saturday, March 17, the market has experienced one of the most active periods in many months. The feature has been large purchases by consumers, dealers

taking very little metal. Even on Saturday, which is usually an inactive day, the remarkable total of 500 tons for that day was sold. This general activity has resulted in a sharp increase in prices, the low point having been 50c. on March 13, with 52.75c. realized on Saturday, March 17. The principal buying was for March-April delivery, but some spot and March metal was included. Demand for June, July and August delivery was very light. Yesterday, Monday, the market was quieter and consumers showed little interest. Sales dropped to about 200 tons. Today the market has been only moderately active with spot Straits tin quoted at 52c., New York. Throughout the week London has been stimulated by the advances here and has been dependent on American orders. Quotations there today were considerably higher than a week ago, with spot standard quoted at £232, future standard at £232 17s. 6d. and spot Straits at £236 10s. Arrivals thus far this month have been 4700 tons and 7130 tons is reported afloat.

Lead.—Demand continues of small proportions and is confined to carload lots, mostly for prompt and March shipment. Quotations are virtually unchanged. The leading interest still maintains 6c. as its contract price at New York, and in the outside market 5.80c., St. Louis, is the established quotation.

Zinc.—Because of considerably higher prices for ore, the tone of the market is stronger. Ore at Joplin last week sold at \$39 and \$40 per ton, sales amounting to over 10,500 tons. Another element of strength was the reduced output which fell to around 8000 tons for the week. Prime Western slab zinc is not correspondingly higher and the advance in price has been comparatively small. For March and early April delivery it is quoted at 5.72½c., St. Louis, or 6.07½c., New York. To correspond to the advance in ore, however, it should be

Metals from New York Warehouse

Delivered Prices Per Lb.

Tin, Straits pig.....	55.00c. to 56.00c.
Tin, bar.....	57.00c. to 58.00c.
Copper, Lake.....	15.25c.
Copper, electrolytic.....	15.00c.
Copper, casting.....	14.25c.
Zinc, slab.....	6.75c. to 7.25c.
Lead, American pig.....	7.00c. to 7.50c.
Lead, bar.....	9.25c. to 10.25c.
Antimony Asiatic.....	12.50c. to 13.00c.
Aluminum No. 1 ingot for remelting (guaranteed over 99 per cent pure).....	27.00c. to 28.00c.
Aluminum ingots, No. 12 alloy.....	26.00c. to 27.00c.
Babbitt metal, commercial grade.....	30.00c. to 40.00c.
Solder, ½ and ¼.....	34.50c. to 35.50c.

Metals from Cleveland Warehouse

Delivered Prices Per Lb.

Tin, Straits pig.....	56.50c.
Tin, bar.....	58.50c.
Copper, Lake.....	15.00c.
Copper, electrolytic.....	15.00c.
Copper, casting.....	14.25c.
Zinc, slab.....	7.50c.
Lead, American pig.....	6.85c.
Antimony, Asiatic.....	16.00c.
Lead, bar.....	9.25c.
Babbitt metal, medium grade.....	19.25c.
Babbitt metal, high grade.....	61.50c.
Solder, ½ and ¼.....	33.75c.

Rolled Metals from New York or Cleveland Warehouse

Delivered Prices, Base Per Lb.

Sheets—	
High brass.....	18.50c. to 19.25c.
Copper, hot rolled.....	22.75c. to 23.75c.
Copper, cold rolled, 14 oz. and heavier.....	25.25c. to 26.25c.

Seamless Tubes—	
Brass.....	23.37½c. to 24.37½c.
Copper.....	24.50c. to 25.50c.
Brazed Brass Tubes.....	26.50c. to 27.50c.
Brass Rods.....	16.25c. to 17.25c.

From New York Warehouse

Delivered Prices, Base Per Lb.

Zinc sheets (No. 9), casks.....	10.00c. to 10.50c.
Zinc sheets, open.....	10.50c. to 11.00c.

Non-Ferrous Rolled Products

Mill prices on bronze, brass and copper products have not changed since Dec. 5. Quotations on lead full sheets and zinc sheets were last revised on Feb. 21 and 27 respectively.

List Prices, Per Lb., f.o.b. Mill

On Copper and Brass Products, Freight up to 75c. per 100 Lb. Allowed on Shipments of 500 Lb. or Over

Sheets—	
High brass.....	18.75c.
Copper, hot rolled.....	22.75c.
Zinc.....	9.50c.
Lead (full sheets).....	9.75c. to 10.00c.

Seamless Tubes—	
High brass.....	23.62½c.
Copper.....	24.50c.

Rods—	
High brass.....	16.50c.
Naval brass.....	19.25c.

Wire—	
Copper.....	15.75c.
High brass.....	19.25c.
Copper in Rol's.....	21.75c.
Brazed Brass Tubing.....	26.75c.

Aluminum Products in Ton Lots

The carload freight rate is allowed to destinations east of Mississippi River and also allowed to St. Louis on shipments to destinations west of that river.

Sheets, 0 to 10 gage, 3 to 30 in. wide.....	33.00c.
Tubes, base.....	42.00c.
Machine rods.....	34.00c.

Rolled Metals, f.o.b. Chicago Warehouse

(Prices Cover Trucking to Consumers' Doors in City Limits)

Sheets—		Base per Lb.
High brass	.....	18.75c.
Copper, hot rolled	.....	22.75c.
Copper, cold rolled, 14 oz. and heavier	.....	25.00c.
Zinc	.....	11.00c.
Lead, wide	.....	9.75c.
Seamless Tubes—		
Brass	.....	25.12½c.
Copper	.....	26.00c.
Brazed Brass Tubes	.....	26.75c.
Brass Rods	.....	16.50c.

selling at 5.90c. to 6c., St. Louis. A moderately good consuming demand is reported, but sellers as a whole are rather reserved under present conditions.

Nickel.—Wholesale lots of ingot nickel are quoted at 35c. with shot nickel at 36c. and electrolytic nickel at 37c. per lb.

Antimony.—Buying by consumers has been of fair proportions recently, but prices are a little lower with Chinese metal quoted at 10.25c., New York, duty paid, for all positions.

Aluminum.—Virgin metal, 98 to 99 per cent pure, is quoted at 23.90c. per lb., delivered.

Non-Ferrous Metals at Chicago

CHICAGO, March 20.—Demand for copper is easier but the price is steady. Heavier buying of tin and zinc is noted and prices have been advanced. The old metal market is quiet.

Prices, per lb., in carload lots: Lake copper, 14.25c.; tin, 54.50c.; lead, 5.90c.; zinc, 5.80c.; in less-than-carload lots, antimony, 12.50c. On old metals we quote copper wire, crucible shapes and copper clips, 10.50c.; copper bottoms, 9.50c.; red brass, 9.25c.; yellow brass, 7c.; lead pipe, 4.75c.; zinc, 3.25c.; pewter, No. 1, 30c.; tin foil, 36c.; block tin, 45c.; aluminum, 11.75c.; all being dealers' prices for less-than-carload lots.

REINFORCING STEEL

Awards of 4050 Tons—4700 Tons in New Projects

AWARDS of concrete reinforcing bars amounted to 1850 tons, as reported to THE IRON AGE. New work amounted to 4700 tons, including 1000 tons each for a printing building and an office structure in Chicago. Awards follow:

NEW YORK, 250 tons, Erie Railroad pier, to Faltoute Iron & Steel Co.
TOLEDO, OHIO, 1600 tons, building for Willys-Overland Co., to Building Products Co.
TOLEDO, 600 tons, addition to Lamson store, to Building Products Co.
CHICAGO, 100 tons of rail steel bars, Geneva Terrace apartment building, to Inland Steel Co.
CHICAGO, 100 tons of rail steel bars, Traemour Hotel, to Calumet Steel Co.
STATE OF ILLINOIS, 120 tons of rail steel bars for road work, to Concrete Steel Co.
STATE OF IOWA, 160 tons for road work, to Concrete Steel Co.
HINE, Mo., 260 tons, basin for St. Louis municipal waterworks, to Laclede Steel Co.
ST. LOUIS, 400 tons, track construction work for Missouri Pacific Railway between Allenton and Boles, Mo., to Laclede Steel Co.
LOS ANGELES, 475 tons, subway at Myra Avenue: S. M. Kerns. Long Beach, Cal., general contractor.

Reinforcing Bars Pending

Inquiries for reinforcing steel bars include the following:

BROOKLYN, 350 tons, section of subway at Prospect Park; bids March 30.
ALBANY, N. Y., 1000 tons, bridge at Tilghman Street; bids in.
ROCHESTER, N. Y., 200 tons, Auto Inns, Inc., garage; bids being taken.
CHICAGO, 600 tons, apartment hotel at 1500 Sheridan Road; McNally & Quinn, architects.
CHICAGO, 1000 tons, printing plant for Reuben H. Donnelley Corporation; Leonard Construction Co., general contractor.
CHICAGO, 1000 tons, Daily News building, Holabird & Roche, architects.

Old Metals, Per Lb., New York

The buying prices represent what large dealers are paying for miscellaneous lots from the smaller accumulators and the selling prices are those charged consumers after the metal has been properly prepared for their use.

	Dealers' Buying Prices	Dealers' Selling Prices
Copper, heavy crucible	12.00c.	13.50c.
Copper, heavy and wire	11.75c.	12.875c.
Copper, light and bottoms	10.00c.	11.25c.
Brass, heavy	7.00c.	8.50c.
Brass, light	6.00c.	7.50c.
Heavy machine composition	9.50c.	10.625c.
No. 1 yellow brass turnings	7.75c.	9.00c.
No. 1 red brass or composition turnings	8.75c.	9.75c.
Lead, heavy	5.00c.	5.50c.
Lead, tea	4.00c.	4.50c.
Zinc	3.25c.	3.75c.
Sheet aluminum	12.50c.	14.50c.
Cast aluminum	12.50c.	14.00c.

CHICAGO, 500 tons, State and Washington Building; W. W. Alschlager, architect.
CHICAGO, 250 tons, building for Rapid Roller Co.; Schmid & Ryan, architects.
AUSTIN, ILL., 250 tons, high school; Harvey Hansen, low bidder on general contract.
ST. LOUIS, 400 tons, warehouse for Atlantic & Pacific Tea Co., Scott and Taylor Avenues.
PORTLAND, ORE., 150 tons, bridge over Willamette River at Springfield; bids March 27.
LOS ANGELES, 5257 tons, Drainage District Improvement No. 23; bids rejected and new bids will be taken April 2.

RAILROAD EQUIPMENT

Chinese Road Will Buy 990 Box Cars—Inquiry for 200 Rapid Transit Coaches

INQUIRIES from the Chinese Eastern Railways for 990 box cars and from the Chicago Rapid Transit Co. for 200 motor elevated coaches and trailers are the most important developments in the railroad equipment market. The Pittsburgh Coal Co. has purchased 600 mine cars. Details of the week's business follow:

Chicago Rapid Transit Co. has made inquiry for 100 motor elevated cars and a like number of trailers.
Atchison, Topeka & Santa Fe is inquiring for 15 locomotive tenders.
Minneapolis, St. Paul & Sault Ste. Marie contemplates the purchase of eight Mountain-type locomotives.
Seaboard Air Line will purchase 500 steel underframes for box cars.
Protane Corporation, Erie, Pa., has ordered three 11,000-gal. tank cars from General American Tank Car Corporation.
Pittsburgh Coal Co. has purchased 600 mine cars from Lorain Steel Co.
Atlantic Coast Line is inquiring for 300 freight cars.
Michigan & Limestone Chemical Co. has purchased two six-wheel switching locomotives from Baldwin Locomotive Works.
Chinese Eastern Railways have made inquiry for 660 25-ton, four-wheel box cars and 330 50-ton, eight-wheel box cars.

High Tonnage in February Orders for Fabricated Structural Steel

WASHINGTON, March 19.—Orders for fabricated structural steel in February totaled 208,241 tons, representing 72 per cent of capacity, based on reports received by the Department of Commerce from 187 firms with a monthly capacity of 289,010 tons. This reflects an increase of 37,412 tons over January, when bookings were 170,829 tons, or 56 per cent of the capacity of the 215 reporting concerns. Computed bookings in February were 270,000 tons, against 210,000 tons, while shipments were 232,500 tons, or 62 per cent of capacity, compared with 210,000 tons, or 56 per cent of capacity.

Both months are ahead of the corresponding months of last year and of 1926. The February gain in computed tonnage of new orders is nearly 11 per cent over 1927 and almost 30 per cent over 1926. The January gains were 7.7 per cent over 1927 and 0.6 per cent over 1926. Only three months in 1927 (July, August and October), one in 1926 (August) and one in 1925 (October) exceeded the figure registered last month, and all were 31-day months, against 29 days.

FABRICATED STRUCTURAL STEEL

New Projects Will Require 34,350 Tons— Awards Decline to 32,700 Tons

WITH 7600 tons for a plant building at Cumberland, Md., and 10,000 tons for subway work in New York, awards in the last week amounted to 32,700 tons. New pending work totaled 34,350 tons, the outstanding projects being a section of the subway in New York requiring 7700 tons, a bridge approach at St. Louis which will take 6000 tons and an aqueduct at Oakland, Cal., requiring 4830 tons. Awards follow:

NEW HAVEN, CONN., 1600 tons, power house for United Illuminating Co., to unnamed fabricator.
MIDDLETOWN, CONN., 200 tons, bank and office building, to American Bridge Co.
WEYMOUTH, MASS., 600 tons, switch house for Edison Electric Illuminating Co. of Boston, to New England Structural Co.
MARSHFIELD, MASS., 200 tons of plates, standpipe, to Chicago Bridge & Iron Co.
NEW YORK, 10,000 tons, subway work, to American Bridge Co.; Triest Contracting Corporation, general contractor.
NEW YORK, 200 tons, Arts Club building, to McClintic-Marshall Co.
STATE OF NEW YORK, 500 tons, highway bridges, to American Bridge Co.
EAST ORANGE, N. J., 600 tons, Municipal Building, to Albert Smith & Sons, Inc.
PHILADELPHIA, 100 tons, school at Buttonwood and Sixth Streets, to Robinson Iron & Steel Co.
PENNSYLVANIA RAILROAD, 558 tons, bridges; 175 tons at Akron, Ohio, to Bethlehem Steel Co.; 257 tons at Baltimore, to American Bridge Co., and 126 tons at Stoney Brook, Pa., to Fort Pitt Bridge Works.
PHILADELPHIA, 440 tons, building for La Salle College, to Bethlehem Fabricators, Inc.
CUMBERLAND, MD., 7600 tons, plant building for Celanese Corporation of America, to McClintic-Marshall Co.
KINGSTON, PA., 500 tons, Nesbitt Memorial Hospital, to Bethlehem Fabricators, Inc.
PITTSBURGH, 500 tons, East Liberty Theater, to Fort Pitt Bridge Works.
WILKES-BARRE, PA., 685 tons, drill shed for 109th Field Artillery, to Bethlehem Construction Co.
CLEVELAND, 2500 tons, transmission towers for Cleveland Electric Illuminating Co., to Blaw-Knox Co.
BLOOMINGTON, IND., 700 tons, building for University of Indiana, to Bedford Foundry & Machine Co., Bedford, Ind.
STATE OF MICHIGAN, 125 tons, highway bridges, Massillon Bridge & Structural Co.
SHAWANO, WIS., 700 tons, highway bridge, to Wausau Iron Works.
CHICAGO, 112 tons, building for Samuel Olsen & Co., to Midland Structural Steel Co., local.
COMAL, TEX., 650 tons, addition to United Gas Improvement Co. power plant, to Virginia Bridge & Iron Co.
SEATTLE, 2000 tons of plates, penstock for city, to Puget Sound Machinery Depot.
SEATTLE, 600 tons of plates, kilns for Pacific Coast Cement Co., to Traylor Engineering Co.
OAKLAND, CAL., 200 tons, theater, Seventeenth Street and San Pablo Avenue, to Pacific Coast Engineering Co.
SAN FRANCISCO, 150 tons, apartment building, Fourteenth and Dolores Streets, to Judson-Pacific Co.
SOUTH SAN FRANCISCO, 370 tons, plant for E. H. Edwards Mfg. Co., to Pacific Coast Engineering Co.
SAN FRANCISCO, 100 tons, bridge over Colorado River, Grand Canyon, Ariz., to Llewellyn Iron Works.
LOS ANGELES, 200 tons, Convent of Good Shepherd, to Llewellyn Iron Works.

Structural Projects Pending

Inquiries for fabricated steel work include the following:

BOSTON, 178 tons, bridge for Boston & Albany Railroad in Brighton district.
NEW YORK, 1000 tons, Vardmont Theater.
NEW YORK, 250 tons, pier on North River for Erie Railroad.
BROOKLYN, 7700 tons, section of subway at Prospect Park; bids March 30.
STATE OF NEW YORK, 500 tons, highway bridges.
JERSEY CITY, 700 tons, theater on Journal Square.
PENNSYLVANIA RAILROAD, 150 tons, bridge.
ALLENTOWN, PA., 200 tons, steel centers for reinforced concrete bridge at Tilghman Street; bids in.
WILMINGTON, N. C., 3000 tons, highway bridge.
LOUISVILLE, KY., 200 tons, war memorial.
LOUISVILLE & NASHVILLE RAILROAD, 800 tons, bridges; bids in.
BIG FOUR RAILROAD, 150 tons, work at Sharonville, Ohio.
DETROIT, tonnage unstated, addition to gear and axle plant of Chevrolet Motor Car Co.

FORT WAYNE, IND., 400 tons, warehouse for International Harvester Co.
AUSTIN, ILL., 3500 tons, high school; Harvey Hansen, low bidder on general contract.
CHICAGO, 120 tons, coal trestle for city pumping plant; Midland Structural Steel Co., local, low bidder.
CHICAGO, 200 tons, Haymarket substation for Commonwealth Edison Co.
CHICAGO, 900 tons, approach to La Salle Street bridge; R. H. Simpson & Co., low bidders on general contract.
SOUTH CHICAGO, 380 tons, power house for Federal Furnace Co.
GARDNER, ILL., tonnage not stated, highway bridge for Chicago & Alton Railroad.
AURORA, ILL., 242 tons, public school.
MILWAUKEE, 1580 tons, County portion of Milwaukee Safety Building; Lakeside Bridge & Steel Co., low bidder on material at \$96,440; Worden-Allen Co., low bidder on erection at \$23,838.
ST. LOUIS, 6000 tons, southern approach to municipal bridge across Mississippi River; bids to be received April 17 by Board of Public Service.
KELLOGG, ORE., 280 tons, bridge over Umpqua River, general contract to Clyde Catching, Roseburg, Ore.
PORTLAND, ORE., 530 tons, bridge over Willamette River at Springfield; bids March 27.
PORTLAND, 220 tons, bridge over McKenzie River near Corburg; bids March 27.
CHEHALIS, WASH., 100 tons, bridge over Chehalis River; bids March 26.
SAN FRANCISCO, 165 tons, apartment building, Bay and Pol Streets; bids being taken.
SAN FRANCISCO, 450 tons, hotel, Geary and Maggie Streets; bids being taken.
SAN FRANCISCO, 400 tons, Medical-Dental Building addition; bids received.
OAKLAND, CAL., 4830 tons, plates for Sequoia Aqueduct, East Bay Municipal Utility District; bids April 20.
OAKLAND, 3668 tons, plates for Wildcat Aqueduct, East Bay Municipal Utility District; bids April 20.
SACRAMENTO, CAL., 600 tons, bridge over Smith River, Del Norte County; bids April 4.
DENVER, COLO., 445 tons, plates, siphons for Kittitas Canal project, Yakima, Wash.; bids April 10 by United States Bureau of Reclamation.

Employment in Manufacturing Is Increasing; Low Point Last November

Employment and activity in the manufacturing industry of the United States have been on the increase since November, 1927, it is indicated by the January, 1928, returns from about 2000 manufacturing plants reporting monthly to the National Industrial Conference Board, 247 Park Avenue, New York. These plants are located throughout the country, are of both large and small size and represent 25 different divisions of manufacturing. Inasmuch as mid-winter is a quiet period in many industries, seasonal influences should show further improvement in February and March.

January figures show more than 1 per cent increase over the number employed last November which, according to the Conference Board's reports, was the lowest ebb of employment for the year 1927 and the lowest since the last quarter in 1924. However, not only has the number of employed increased, but the total number of hours worked in these plants shows an even greater increase, totaling 3½ per cent more than in November, 1927. This, the Conference Board points out, indicates not only more employees at work but an increased number of working hours per employee, and thus an increase in activity exceeding that indicated by the additional number of men engaged. Average weekly earnings per worker during January showed a proportionate increase.

To Show "The Story of Iron"

"The Story of Iron," a new educational motion picture film produced by the United States Bureau of Mines, in cooperation with three iron companies, will be shown for the first time before the New York section of the American Institute of Mining Engineers, at the Machinery Club, on the evening of March 22. The preparation of this film was noted on page 739 of THE IRON AGE, March 15. C. S. Robinson, vice-president of the Youngstown Sheet & Tube Co., will describe in some detail the features shown in the film.

PERSONAL

Charles M. Schwab returned on Tuesday from his European trip, coming on the Aquitania.

Albert C. Marble, superintendent Curtis & Marble Machine Co., Worcester, Mass., was elected president of the Worcester branch of the National Metal Trades Association at its twenty-seventh annual business meeting held last week. He succeeds A. Sherman Miller. Other officers elected were John C. Spence, Norton Co., vice-president, and William Arter, Arter Grinding Machine Co., treasurer. F. A. Ball, L. S. Starrett Co., Athol, Mass.; Richard C. Fosdick, Fitchburg Steam Engine Co., Fitchburg, Mass.; Elliot J. McKnight, L. G. McKnight Co., Gardner, Mass.; Charles A. Clarke, Universal Boring Machine Co., Hudson, Mass.; and J. J. Adams, J. J. Adams Co.; H. H. Wright, M. S. Wright Co.; Philip M. Morgan, Morgan Construction Co.; Fred S. Morton, Matthews Mfg. Co.; William B. Smith, James Smith & Sons, and Fred W. McIntyre, Reed-Prentice Co., all of Worcester, were elected to serve on the executive board.

Edward L. Steinle, sales manager of the New Britain Machine Co., has returned from a trip through England, France, Germany, Italy and Belgium.

Marcus A. Thompson, welding superintendent of the Boston & Maine Railroad, spoke on metal cutting and welding at the March meeting of the Boston section of the American Welding Society.

Joseph H. Barber, assistant to the president Walworth Co., Boston, spoke recently on "Planning Tomorrow's Business" before the executive club of the Boston Chamber of Commerce.

H. M. Lane, president H. M. Lane Co., Detroit, made an illustrated address before the New England Foundrymen's Association at its monthly meeting in Boston on March 14. He discussed foundry problems.

Leonard S. Taylor has retired as vice-president in charge of operations of the Acme Wire Co., New Haven, Conn. Edgar L. Hartpence, general manager, succeeds Mr. Taylor and also retains his old position.

Charles W. Beaver has been made president and treasurer of the Lockwood Mfg. Co., South Norwalk, Conn., to succeed George H. Lockwood, who has retired on account of ill health. Gen. Russell Frost has been made vice-president, and Nelson T. Hayes, secretary and assistant treasurer. Until two years ago Mr. Beaver was foreign representative of the Yale & Towne Mfg. Co., Stamford, Conn.

C. D. Baldwin, purchasing agent of the Bangor & Aroostook Railroad, has been elected president of the New England Railroad Club, succeeding F. C. Shepherd, chief construction engineer of the Boston & Maine Railroad.

Richmond Fletcher of Scovell, Wellington & Co., Boston, engineers and accountants, has been made a director of the Kinney Mfg. Co., Boston, maker of pumps.

W. G. Prasse has been appointed to represent the Oilgear Co., Milwaukee, in the New York district, and will have offices at 342 Madison Avenue.

Stanley A. Daniels, who has been in charge of the roll department of the Trumbull Steel Co., Warren, Ohio, has been appointed superintendent of the company's hot strip department, succeeding A. J. Schink. Before going with the Trumbull organization Mr. Daniels was identified with the Republic Iron & Steel Co. at Youngstown. J. A. Lafferty has been placed in charge of the Trumbull roll department. Recently he

was associated with the Weirton Steel Co., Weirton, W. Va., and previously with the Pittsburgh Steel Co., Monessen, Pa.

J. B. Hamilton has opened an office at 221 Journal Square National Bank Building, 40 Journal Square, Jersey City, N. J., and will engage in the sale of new and used machinery. His line will include machine tools, plate rolls, punches and shears, air compressors, pumps and contractors' machinery.

Edmund J. Lowry, for the past six years consulting metallurgist for Hickman, Williams & Co., in that capacity serving the several offices of the company, has resigned, to enter consulting engineering work on his own account, and has opened an office in the General Motors Building, Detroit. Mr. Lowry has been active in studying the metallurgy of foundries, and is the author of the American Foundrymen's Association exchange paper to be presented at the convention of the Belgian Foundrymen's Association on April 18.

Clarence R. Falk, secretary-treasurer Falk Corporation, Milwaukee, has been appointed general chairman of the annual campaign of the Milwaukee County Community Fund. The campaign will be undertaken in October with the objective of raising approximately \$1,000,000 for the support of a joint budget of 35 charitable organizations.

Eugene W. Stern, consulting civil engineer, 56 West Forty-fifth Street, New York, has been appointed vice-president of the Colonial Iron Works, Cleveland. For many years he was chief engineer of highways, Borough of Manhattan, New York. He will act in an advisory capacity to the Colonial company.

P. P. Barrett has been appointed representative in the Cincinnati territory for the Reading Iron Co., Reading, Pa., and will have headquarters in Indianapolis.

J. V. Coulter, for the last five years connected with the San Francisco sales organization of the Midvale Co., Philadelphia, has been appointed manager of a new branch office and warehouse recently opened at 568 Third Street, San Francisco, by the Earle M. Jorgensen Co., Los Angeles, distributor of alloy and tool steels.

Edward Hankin, superintendent of the blacksmith department New York Air Brake Co., Watertown, N. Y., on March 13 was honored at a banquet given by the executive staff of the company in recognition of his 50 years' service with the plant.

William E. Allen, for a number of years chief engineer of the Robbins Body Corporation, Indianapolis, has been appointed vice-president and general manager of Motor Bodies, Inc., Evansville, Ind., recently formed as an automobile body manufacturing subsidiary of the Graham-Paige Motors Corporation, Detroit. The new company has taken over the plant formerly operated by the Johann Mfg. Co. W. H. Neely, assistant to the president of the Graham-Paige organization, is president of the new division.

Lewis Buckley Stillwell has been elected to serve his fourth term as chairman of the Engineering Foundation, the research organization of the National Engineering societies.

Jordan Korp, Leeds & Northrup Co., Philadelphia, spoke before the St. Louis chapter, American Society for Steel Treating, March 14 on "Tool Design and Heat Treating and Relationship to Production."

Ralph T. Montag, manager Montag Stove Works, Portland, Ore., has been elected second vice-president of the Oregon Manufacturers' Association.

T. A. Hyde, for some years associated with the Henry G. Thompson & Son Co., New Haven, Conn., has been elected a vice-president. He has recently taken charge of the New York territory, including export business, with offices at 126 Chambers Street. A. W.

Tucker has been elected secretary of the company. He has been identified with the Thompson organization for a number of years and will have charge of the home office at New Haven.

N. Morton Skillin, for the last three years associated with Oakes Brothers, Boston, has been placed in charge of the Boston office of the Cohoes Rolling Mill Co., Cohoes, N. Y., manufacturer of wrought iron pipe. He succeeds P. L. Watkins, who has been transferred to the company's Chicago office.

C. L. Shedd, general manager of automotive sales in the Western district for the American Bosch Magneto Corporation, with headquarters at Chicago, has been placed in charge of the Detroit district in addition to the Chicago territory, following the merging of the company's branches in those cities. Elliott S. Hanson, who was automotive divisional sales manager at Detroit, has been promoted to the general sales division of the factory at Springfield, Mass., and will be engaged as special representative in the New York branch.

William J. Wooley has been elected president of the L. Wolff Mfg. Co., Chicago, manufacturer of plumbing supplies, under its recent reorganization in which the management and control of the company was turned over to employees. He went to the Wolff company three years ago to aid in the conduct of the business which had suffered serious financial losses, and was largely responsible for the reorganization. Other officers are William T. Mahoney, vice-president in charge of production; Henry I. Warden, vice-president; Arthur H. Jolliffe, secretary, and O. P. Decker, treasurer.

Arthur B. Hykes, who has been associated with the Central Iron & Steel Co., Harrisburg, Pa., since Nov. 1, 1926, has been appointed assistant general sales manager, succeeding the late Frank I. Hoover. From 1909 to 1926 Mr. Hykes was connected with the Shanghai office of the United States Steel Products Co., the last four years as manager for China. Shortly after his return to this country he entered the employ of the Central company as a traveling representative, and within the past nine months has been in charge for short periods of the company's district offices at Baltimore, Boston and Philadelphia.

William Manealoff, until recently in charge of steel imports for Winter, Wolff & Co., 225 Broadway, New York, has formed Manealoff & Co., Inc., 11 Broadway, to import and export steel products. He is president and L. M. Solis-Cohen, treasurer.

Julian Burdick, president West Penn Steel Co., Brackenridge, Pa., is reported to be recovering satisfactorily from injuries sustained in an automobile accident, March 10. He is at the Pittsburgh Hospital.

Walter H. Pfeil has been appointed roll foundry superintendent of the Birdsboro Steel Foundry & Machine Co., Birdsboro, Pa. He is a native of Pittsburgh and has spent the greater part of his life as a metallurgical engineer in the steel industry. He attended the Colorado School of Mines and Carnegie Institute of Technology, specializing in metallurgy. He was first associated with the Lewis Foundry & Machine Co., Pittsburgh, and later built the roll department of the Standard Engineering Co., Ellwood City, Pa., having been with this concern for five years. He then spent two years with Farrel Foundry & Machine Co., Ansonia, Conn., as metallurgist, and seven years with Hubbard Steel Foundry, East Chicago, Ind., as chief metallurgist and roll foundry superintendent.

W. J. Borst, who has been master mechanic of the John Deere Harvester Works, East Moline, Ill., has been made acting superintendent of the plant, succeeding the late C. Arthur Schoessel. He has been associated with Deere & Co. for 16 years.

George H. Laib, recently president of the Laib Co., Inc., Louisville, has been elected president of the J. L. Mott Co., Inc., recently formed by a consolidation of

the Laib Co. and Columbia Sanitary Mfg. Co., Louisville, and the J. L. Mott Co., Trenton, N. J. Other officers are W. G. Probst, vice-president and general manager; Jordan L. Mott, 3d, vice-president and secretary, and J. E. Siegel, treasurer. Mr. Mott will be in charge of the New York offices and showroom, which will be removed shortly from Fifth Avenue and Seventeenth Street to 369 Lexington Avenue, and will have supervision over the metropolitan district and northern New Jersey. H. J. Carey will be sales manager for this district. The various branches of the Mott and Laib companies will be retained with few important changes in personnel.

George T. Thomas has been appointed New York sales representative of the Empire Steel Corporation, Mansfield, Ohio. He was formerly connected with the Columbia Steel Co., Butler, Pa., and later with the United Alloy Steel Corporation, Canton, Ohio.

OBITUARY

HOWARD MELVIN DAVIS, general superintendent of the Newport Rolling Mill Co., Newport, Ky., died March 18, following an operation for appendicitis. He was born at Plumville, Pa., 55 years ago and during most of his life had been identified with the sheet steel industry. He had been connected with the Newport plant for about 10 years and previously had been superintendent of one of the departments of the American Sheet & Tin Plate Co., at its Gary, Ind., plant.

WALTER B. LEACH, president of the Hunt-Spiller Mfg. Corporation, Boston, died on March 13 at his home in Brookline, Mass., aged 58 years.

OLE C. SYVERTSEN, for 25 years a heating engineer and representative of the Weir Stove Co., Taunton, Mass., and more recently with the Magee Furnace Co., Boston, died on March 15 at the Exeter Hospital, Exeter, N. H., following a long illness. He was born in Norway, July 17, 1865.

R. E. HART, manager and owner of the R. E. Hart Mfg. Co., Battle Creek, Mich., maker of revolution counters, died suddenly on March 5.

DEAN E. HETHINGTON, secretary and assistant treasurer of the Globe Forge & Foundries, Inc., Syracuse, N. Y., was drowned recently in the St. Lawrence River near Clayton, N. Y., when an automobile in which he was driving broke through the ice of the river. He was 49 years of age.

EDWARD A. JONES, president and treasurer E. D. Jones & Sons Co., Pittsfield, Mass., died Feb. 29.

ALFRED BARKER, president of James Barker, Inc., and of the Barker Machine & Foundry Co., Philadelphia, died March 13, at his home in that city.

EDGAR H. FULLER, formerly general manager of the Fuller Mfg. Co., East Moline, Ill., and later general sales manager of Root & VanderVoort, East Moline, died on March 16 at his home in Joliet, Ill. In recent years he had been associated with the Witte Iron Works, Kansas City, Mo., and with the Moline Iron Works, Moline, Ill.

HERBERT E. HARDIN, superintendent of the Acme Harvester Co. at the time it was removed from Peoria to Pekin, Ill., for a time superintendent of the old Kingman Plow Co., Peoria, and for many years superintendent of the Ohio Rake Co., Dayton, Ohio, died on March 16 at Anchorage, Ky. He was 66 years of age.

CARL D. BRADLEY, president Michigan Limestone & Chemical Co., Rogers City, Mich., a subsidiary of the United States Steel Corporation, and president Bradley Transportation Co., Rogers City, died March 19, at Pasadena, Cal.

Cleveland Branch of Metal Trades Association Holds Annual Meeting

The annual meeting and banquet of the Cleveland branch of the National Metal Trades Association was held at the Hotel Cleveland, that city, March 15, with an attendance of 110, which was said to be the largest in the history of the branch. Jacob D. Cox, Jr., Cleveland Twist Drill Co., was reelected president. Other officers elected were: vice-president, E. J. Stahl, Baker-Raulang Co.; treasurer, W. C. Sayle, Cleveland Punch & Shear Works Co.; executive committee, P. A. Geier, P. A. Geier Co.; J. H. Hertner, Hertner Electric Co.; George E. Randles, Foote-Burt Co., and E. T. Causer, Chandler-Cleveland Motors Corporation.

H. J. Briggs, vocational director of the Cleveland schools, in a paper discussed the work of the Cleveland trade school and machinists' apprentice group, which is being conducted with the cooperation of the members of the Cleveland branch. At the conclusion of his address President Cox urged the full cooperation of the members in this work. Homer D. Sayre, commissioner of the National Metal Trades Association, discussed association and business conditions from the national viewpoint. T. Yeoman Williams, executive secretary of the League for Industrial Rights, discussed labor's attitude toward anti-trust and anti-injunction laws.

Reports of the officers showed that the Cleveland branch is in a prosperous condition. There was a membership gain of six during the year and no losses.

American Association of Engineers to Meet

The American Association of Engineers will hold its fourteenth annual convention in El Paso, Tex., on June 4, 5 and 6. M. E. McIver, 63 East Adams Street, Chicago, is secretary. After preliminary organization matters, the annual address will be delivered by the president, W. R. Harris, at 11.30 on the first morning. Sessions will be held that afternoon and the two following mornings, leaving the second and third afternoons free for inspection trips.

Electrochemists Plan April Meeting

The American Electrochemical Society will hold its annual meeting at Bridgeport, Conn., April 26 to 28, attracted to that district because of important developments in the electric manufacture of brass. On April 26, the society will convene at the Hotel Stratfield. It will devote all of Friday morning, April 27, to the discussion of electric heating, melting and electric furnace linings. Among those who will participate in this discussion are R. E. Talley, president and chief engineer of George J. Hagan Co., Pittsburgh; R. M. Keeney, industrial heating engineer Connecticut Light & Power Co.; John L. Christie, metallurgist Bridgeport Brass Co.; Dr. B. D. Saklatwalla, vice-president Vanadium Corporation of America, and others.

The president of the society is Prof. S. C. Lind, head of the department of chemistry of the University of Minnesota and well-known radium expert of America. He is also the American representative of the International Radium Standards Commission. Professor Lind will show the members a number of startling gas reactions brought about by radium emanations.

The Thursday morning session, April 26, will be devoted to a discussion of new batteries, at which Dr. George W. Vinal, the expert of the United States Bureau of Standards, will preside. Thursday afternoon the members will visit plants in Bridgeport and vicinity. Thursday evening there will be a public lecture by Prof. Bergen Davis of Columbia University, who will demonstrate the use of the X-ray in the study of metals and compounds. Professor Davis will show by means of slides the results of years of careful investigation.

The local committee is headed by John L. Christie, metallurgist Bridgeport Brass Co. Other members of

his committee include the following: F. M. Turner, Charles J. McElroy, W. G. Stratten, Raymond O'Connor, W. O. Mitscherling, Karl Pitschner, Walter M. Bradley, William Delage, George B. Hogaboom and J. C. Bradley.

The final session, to be held Saturday morning, will be devoted to papers on electropolating of nickel, gold, silver, chromium and thallium. Prof. E. M. Baker of the University of Michigan, will preside over this session.

British Imports of Iron and Steel Increase, While Exports Decrease

WASHINGTON, March 19.—Imports of iron and steel products into Great Britain in February totaled 292,918 gross tons, against 283,921 tons in January, while exports aggregated 317,036 tons, compared with 332,185 tons. The increase in imports and the decrease in exports began in January. The increases in imports in February were made in 13 of the 19 classifications and applied mostly to steel bars, rods and angles, and iron bars, rods and angles. Decreases in exports in February also included 13 classifications out of 19, and involved such lines as plates and sheets, steel pipe and rails. The most notable increases were made in tin plate, galvanized sheets and pig iron.

Production of pig iron in the British Isles, according to a radiogram received by the Department of Commerce from William L. Cooper, commercial attaché, London, decreased slightly during February, as compared with January. Raw steel, on the other hand, registered a gain of 18.1 per cent. Reports indicate that at the close of February there were 148 blast furnaces and 278 open-hearth furnaces in operation.

Makes Car Frames Automatically

(Concluded from page 796)

ers. The finished bars are carried on conveyors direct to the general assembly line. Each line in this unit has a capacity of 450 pieces per hour.

Unit No. 5 is the side bar finishing and parts assembly line. This unit consists of a single line carrying both right and left-hand bars for all operations, and is driven by a single motor of 200 hp. This machine has 38 trucks, on which the formed bars are automatically loaded, one right-hand and one left-hand bar to each truck. The trucks are moved on a reciprocating conveyor and stop at 19 stations. At each station several machines are performing, and the work done includes the pinning and riveting of the brackets to make complete side bar sub-assemblies. The capacity of this line is 900 right and left-hand bars, or 450 each, per hour.

Unit No. 6 is the general assembly line. Here a machine picks up the side bar sub-assemblies and cross bars, clamps them together, and drives the rivets into position. Rivets are fed through compressed air tubes to guns which discharge the rivets when the frame is in proper position. The capacity of this line is 360 frames per hour.

Unit No. 7 is the inspection and conveyor line. The finished frames are carried to the final inspection line, where they are checked for alignment, holes, rivets, etc. The frames are then conveyed to Unit No. 8, which is the washing and painting department. The frames are automatically loaded on a washing machine, where they are subjected to a thorough cleaning to remove all oil, grease and dirt which has accumulated during the manufacturing processes. With the washing machine is combined a dryer, where the excess water is taken off, and the frames are then conveyed by gravity to the loading station of a painting machine. The paint, which is a high-temperature baking enamel, flows at the rate of 750 gal. per minute, the excess enamel being drained off and returned to the tanks. The conveyor chain on the painting machine is about 700 ft. long and passes through a two-story oven. The time of baking is 60 min.

Hidden Defects in Iron Castings

(Concluded from page 793)

or similar castings, foundrymen agree that the only way to produce a kettle which will not leak is to cast it with the bottom down. No one would attempt to cast one of these kettles with the bottom up, and expect to get a casting which would not have a leaky bottom. The bottom of the turbine casing and the bottom of a kettle casting are identical as far as the question of producing a solid casting is concerned.

Hidden Defects Caused by Chaplets

OCCASIONALLY objections are raised to the use of chaplets in a casting, because it is sometimes necessary to drill them out and plug the hole. But when we realize the great value a chaplet has, in maintaining the proper thickness of metal throughout the casting, we can well afford to plug one occasionally.

Steel chaplets are safer than cast iron chaplets, because a steel chaplet can be much smaller than an iron chaplet without fusing when the metal is poured around it. The objection to using a cast iron chaplet is the danger of liquid metal melting the chaplet, thus taking the necessary support away from the cores and allowing them to move with the flow of the metal. As the steel chaplet does not melt so readily as the iron chaplet, there is less danger of the cores being deprived of their necessary support.

Years ago, when cast iron chaplets were used almost universally, it was necessary to make them very large to keep them from melting when the mold was poured. It was found that, in cases where the chaplet was not tight, a large chilled hole was produced. This objectionable feature of iron chaplets led to the steel chaplets.

A loose chaplet is safer than a fused or partly melted chaplet. With a loose chaplet all that is necessary is to drill it out and plug a nice, smooth hole. With a partly fused chaplet, a blowhole is produced of such irregular shape that plugging is often impossible.

If a chaplet melts completely, the core loses its support; if a chaplet melts partially, while it may still act as the support it was intended for, the partial fusing always produces a bubble or a blowhole. Hence we contend that a loose chaplet will produce a safer casting than a partially fused chaplet.

A leak in a casting caused by a loose chaplet does not in any way indicate defective metal, or that there are soggy places in the casting. But it does indicate that the metal was allowed to cool before pouring, and was not hot enough to burn into the surface of the chaplet.

It is not always advisable to pour metal into a mold at too high a temperature; and cleaner metal is produced when it is allowed to remain in the ladle for a period before pouring. This is because, during this period, large portions of the impurities rise to the surface of the metal and can be skimmed off. The ideal temperature of metal for pouring castings similar to turbine casings would be just hot enough to run into the thinner sections. Maintaining this temperature would have a tendency to reduce the shrinkage cavities in the heavier sections.

This is not always true with all castings. But when it is employed, it often results in a loose or leaky chaplet. It has been considered safer to take the chance of having a leaking chaplet, by not pouring the metal too hot, than to pour it hot and probably create internal shrinkage cavities, near the heavy sections.

Other Types of Hidden Defects

ANOTHER illustration of the creation of hidden defects, in making the casting pass inspection, is shown in Fig. 3. Figs. 3 and 4 are cross-sections of

two molds for a cast iron combination face plate and shaft, cast in one piece. Fig. 3 shows the method formerly used to make this casting.

This plan of casting the shaft up had been resorted to, to assure a perfectly clean surface on the face of the 6-ft. face plate. A clean face was produced, but at the cost of the strength of the shaft, because, in spite of the best attention to feeding and churning, large shrink cavities occurred at the points where the smaller sections of the shaft joined the larger sections, shown at *EE* and *FF*. Often these defects were uncovered during the machining process, and the castings had to be either welded or scrapped.

The remedy for these defects in the shaft was to pour the mold with the face plate up, as shown in Fig. 4. More stock ($\frac{1}{2}$ in. extra) was allowed for machining the face. The result was a perfectly solid shaft, and a clean surface on the face plate. However, had a defect developed on the surface of the face plate, it would have been a much safer proposition to weld this surface than to weld the defects previously found in the shaft section of the casting, where the strength was materially affected.

Another important item connected with the revised molding of this casting was that it required only one-half the molding time to produce it. This applies to many castings of this character, where hidden defects are produced in the effort to make the casting pass inspection.

Most heavy sections in an iron casting must be fed with a properly prepared feeding head. These heads must be churned to keep them open and to make it possible to feed additional metal down as the metal already poured begins to solidify and settle. If this is not done, a shrink cavity will result, and a weaker casting than the engineers have figured on will be produced. The dangerous part of it all is that the defect is too often hidden.

Slight Increase in Wholesale Prices

Prices of commodities in February are reported by the United States Bureau of Labor Statistics at 96.4, compared with 96.3 in January. Both figures are a little higher than the 95.9 of February, 1927, and all are related to 100 as the average of 1926. Foods, fuel and lighting, metals and building materials showed fractional increases over January, while hides and leather products made an increase of 3 per cent. Farm products, textiles, chemicals and drugs and house furnishings showed fractional declines.

Metals and metal products, at 98.3, compared with 98.1 a month earlier and with 98 a year earlier, showed an increase because of advances in iron and steel prices. There was a decline in non-ferrous metals and a stationary condition in agricultural implements and automobiles.

New Oakland Assembly Plant Completed

The new assembly and shipping plant of the Oakland Motor Car Co. at Pontiac, Mich., has been completed, according to an announcement by A. R. Glancy, president of the company, and installation of conveyors and line equipment will begin at once. The new buildings provide the company with 580,191 sq. ft. of additional floor space. Contract for the foundations of the building was let on Oct. 29 last, and the structure was completed in what is thought to be record time. Nearly all of the machinery to be used in the plant is to be new, but the old assembly factory will be closed down on March 24, when a part of its equipment will be transferred to the new building. Production will be resumed, in the recently completed building, on April 2.

Blast Furnace Practice in Germany

(Concluded from page 803)

sending them to Germany and the rubble to America. So, while we in America have come to like, or at least tolerate, fine ores, and have developed furnace lines, fuel, blowers and charging equipment to fine natural ores, the Ruhr District has clung to coarse ores, natural or artificial. And this is all logical: After we had set a pace in tonnage output and coke economy, the only way the Ruhr District could follow, with the low-pressure blowing equipment and inflexible tub charging system, was to keep the burden open.

Coke More Irregular Than Ours

My distinct impression is that, leaving aside an exception here and there, German coke is not so well prepared as ours, being more irregular in size, more irregular in analysis and moisture. As another general proposition, the Ruhr coals do not seem to produce a by-product coke as dense and incombustible as is still the case with many of our coal and oven operations, and one finds a distinctly larger coke in use than I see here.

From data I secured the coke will average 30 lb. per cu. ft., and sometimes 32 lb. Ash and sulphur are 8 to 9 per cent, with 1.0 to 1.3 per cent sulphur and 4 to 8 per cent moisture. There is remarkable absence of fingery coke and cross fracture, and the coke does not break up easily. The structure seems close but regular, and little of sponge or pebble.

Ruhr coke is excellent, regardless of irregularity in size and moisture, and probably not so delicate or reactive to furnace variations as is much of ours.

Charging Less Scrap Than We Do

Scrap is not used to the extent that one encounters here, unless its use is camouflaged most successfully. Much of the borings and turnings is briquetted for open-hearth, or even foundry, use, thereby eliminating this large source of supply.

Flue dust is not recharged raw, except at one plant of nine I visited, where it is put back in to the extent of 5 per cent. They were, however, installing a Greenawalt plant. One plant was blowing the dust back in, 45 ft. beneath the top, or say 30 ft. below the stockline, in a single 3-in. opening. They use clean blast furnace gas, compressed to 60 lb., as a conveying fluid means, using 2200 cu. ft. of gas a minute. They reuse all dust made on three furnaces into one furnace, amounting to 70 tons a day. The regularity of the furnace is good and the result not discernible at the tuyeres, as far as sloppy conditions or burning of tuyeres is concerned. The same system is used at one other plant, where over 100 tons a day is injected into a single furnace.

Charging Less Flexible Than With Us

Coming to stocking and charging equipment: As a comparison, at one plant are three furnaces with Nee-land tub filling, as modified after its adoption in the Ruhr District. The material modification is in the use of a tub much larger than those at Youngstown, Canton, Duquesne and Sparrows Point. There are two other furnaces with double skip and McKee top. The furnaces differ in lines and capacity, but not materially, and are of typical German construction. The skip-filled furnaces make 7 per cent dust and the tub-filled furnaces 3 per cent dust.

Skip-filled furnaces burn but three-fourths as many tuyeres as do the tub-filled furnaces. The skip-filled furnaces make about 20 tons more iron a day, and use about 40 lb. less coke. The pressure is said to be a bit higher on the skip-filled furnace, but both are under 16 lb. I recite this since it is the only going comparison I found abroad between tub-filling and skip-filling. I believe there is a trend toward skip-filling abroad.

While there may be found some over-engineered tub-filling systems, where one hoist handles the tubs for two furnaces, with a complicated transfer system on top, that is not representative. Standard equipment is one hoist per furnace, with well-worked out control.

The disadvantage of the large tub-filling system as applied to our materials is obviously its lack of flexibility as compared with the double skip. The structure is heavier and more expensive.

Control Tube Much Used

A most striking departure in the top is the use of a control tube. On a 17-ft. stockline, the tube is 7 ft. 9 in. in diameter. It is held by brackets and extends down about 8 ft. The bell is from 8 ft. to 12 ft. 9 in. in diameter. It is, I believe, more largely characteristic of minette ore practice than of the present Ruhr mix. It has been abandoned at some works, and some men stated that its helpfulness was problematical. Sometimes it becomes detached and goes down along with the burden. In Luxemburg it is considerably used, with arrangements for changing its position.

(To be concluded)

Oil and Gas Power Meeting

A national meeting on oil and gas power is being planned by the American Society of Mechanical Engineers for June 14, 15 and 16, at Pennsylvania State College, State College, Pa. In connection with the meeting there will be an exhibition—the first of its kind—of oil and gas engines, parts and accessories. It will be located in the new mechanical laboratory of the college, which has 20,000 sq. ft. of floor space. The college is providing exhibition space free of charge and is supplying light, power, steam and compressed air for the use of exhibitors.

The technical program calls for a number of sessions on subjects of vital interest to this field of engineering. Such subjects as power economics, fuel oil specifications, research and specialization in engine manufacturing will be discussed by prominent engineers and executives in the industry.

Electric Power Capacity of Japan 15 Per Cent Greater in 1926

The total authorized capital of Japan's electrical industry at the end of 1926 was 3,495,000,000 yen (\$1,-642,650,000 at the present yen value of 47c.), a 24 per cent gain over the preceding year, according to a report received from Tokio by the Department of Commerce, Washington. Power-generating capacity increased 15 per cent to 33,190,000 kw., of which 2,000,000 kw. was from hydroelectric plants. The total horsepower of electric motors in operation was 2,290,000, an increase of 210,000 hp.

Safety Guides Published

Handbooks covering the national electrical safety code, together with safety rules for installation and maintenance of various types of electrical equipment and for their operation, have been issued by the United States Department of Commerce. They may be obtained from the Government Printing Office, Washington, at \$1 for the "National Electrical Safety Code"; 60c. for "Line Construction"; 15c. each for "Electric Utilization Equipment" and "Rules for Operation of Electrical Machinery and Lines"; 10c. each for "Electrical Supply Stations" and "Radio Installations."

More Mechanical Stokers Sold

Sales of mechanical stokers in February are reported by the Department of Commerce at 85 units, aggregating 43,643 hp. This is the largest rating since last August, and with two exceptions the largest since March, 1927. It compares with 75 units of 26,572 hp. in January. A year ago there were 105 units sold in February, amounting to 41,400 hp.

Low Prices Depress Steel Earnings

Steel Corporation Profits in 1927 Were 24.7 Per Cent Less Than
in 1926 — Independents Had Larger Decrease — 20 Com-
panies Earned Only 5.1 Per Cent on Stockholders' Value

WITH a decrease of 1,304,646 tons or 9.12 per cent in total shipments of rolled and finished products and a decline of \$2.38 and 81c. respectively in the average domestic and export prices as compared with the preceding year, the net profits of the United States Steel Corporation in 1927 fell off 24.7 per cent from the previous year. According to the corporation's annual financial statement, last year's profits were also about 3 per cent less than those of 1925, as were also total shipments of rolled and finished steel. However, the average price on identical products for both domestic and export shipments declined about \$3.50 per ton in the two years, and a similar comparison of 1924 with 1927 shows a decrease of \$6.78 per ton in prices received for domestic business and of \$6.40 per ton for export shipments.

Operations Fairly Satisfactory

"Conditions attending operations during 1927," says the report, "were not as favorable as they were in the preceding year, yet despite the restrictive influence of decreased production and lower prices, the results secured were on the whole fairly satisfactory. Operating efficiency was well maintained, notwithstanding during a considerable part of the year it was necessary

to adjust production to demand. The fair volume of demand for steel products which prevailed at the opening of the year continued only during the first four months, following which there was a marked decline which continued during the balance of the year. The substantial tonnage of unfilled orders carried over from 1926, with the rather liberal tonnage of business received during the first quarter, enabled the mills to operate at an average of about 87 per cent of capacity during the first six months, while during the last half the average was reduced to 70 per cent. The average for the entire year was 78.9 per cent, compared with 88 per cent in 1926. . . . Beginning about the middle of December, 1927, there was a substantial increase in the demand for products, with a greater stability in selling prices which has continued to the present time." This led to an increase in unfilled orders which stood at 4,398,189 on March 1, 1928, as compared with 3,972,874 on Dec. 31, 1927, and with 3,960,969 at the close of 1926. Operations during the first two months of 1928 averaged 86.5 per cent of capacity.

Production and Volume of Business

Decrease in output during 1927 as compared with 1926 was general in all lines except cement. Incidentally the exact reverse was true in 1926 compared with 1925. "In the case of finished products for sale," the report continues, "the decreases in 1927 were particularly large in the heavier classes of products used to a large extent by railroads, and in sheets and tin plates. A very considerable part of this latter decrease is attributable to a lessened demand for tin plates due to the canning industry's having carried over a large pack from 1926." Detailed production figures are shown in Table I.

The total value of business transacted by all subsidiaries during 1927 was \$1,310,392,861, as against \$1,508,076,090 in 1926. Of the 1927 total \$870,235,942 resulted from sales of manufacturing, iron ore and coal and coke companies, while \$319,445,504 was represented by inter-company sales. In 1926 the corresponding figures were \$987,137,166 and \$384,586,172. The remainder of the gross receipts from business was accounted for by transportation and miscellaneous companies.

In shipments in 1927 the greatest decrease as compared with 1926 was shown by iron ore, coal and coke, the decline having been 48.85 per cent. The decrease in rolled and finished steel products shipped was only 9.12 per cent. Domestic shipments of these products declined 8.57 per cent and export shipments 14.57 per cent. Detailed comparisons of shipments may be found in Table II.

Capital Expenditures and Dividends

Expenditures for additional property, new plants, extensions and betterments less credits for sales of property and salvage, and including lock-up in striping and development expenses at mines, amounted to \$97,585,998 in 1927. As usual the greater part of this sum, or \$64,368,107, was taken by manufacturing properties, while \$15,466,896 went into by-product coke plants. In the previous year capital expenditures amounted to \$76,060,520, of which \$59,485,328 went into manufacturing plants. In 1926 only \$4,149,217 was taken by by-product coke plants, the large outlay last year having been occasioned by the construction of a gas line from the Clairton, Pa., plant to works in the Pittsburgh district. The more important plant additions

Table I.—Production in 1927 and 1926

Products	1927 Tons	1926 Tons	Decrease, Per Cent
Ores mined	25,646,927	29,262,741	12.4
Limestone quarried (in- cludes dolomite and fluorspar)	4,656,150	5,513,739	15.6
Coal mined	27,430,329	34,294,657	20.0
Beehive coke	1,815,910	3,823,047	52.5
By-product coke	12,691,070	13,513,287	6.1
Pig iron	13,631,498	15,540,912	12.3
Spiegel, ferromanganese and ferrosilicon	152,728	164,389	7.1
Bessemer ingots	3,706,404	4,343,788	14.7
Open-hearth ingots	14,780,040	15,962,880	7.4
Rolled and finished steel products:			
Steel rails (heavy and light tee and girder) ..	1,482,353	1,764,589	16.0
Blooms, billets, slabs, sheet and tin plate bars	758,847	750,137	1.2*
Plates	1,423,277	1,526,153	6.7
Heavy structural shapes	929,175	1,029,152	9.7
Merchant bars, hoops, skelp, light shapes, etc.	2,426,363	2,821,093	14.0
Tubing and pipe	1,625,994	1,690,798	3.8
Wire rods	177,770	168,754	5.3*
Wire and wire products ..	1,259,907	1,307,099	3.6
Sheets (black and gal- vanized) and tin plates	1,645,358	1,884,789	12.7
Finished structural work	553,988	615,315	10.0
Angle splice bars and all other rail joints	273,916	313,345	12.6
Spikes, bolts, nuts and rivets	63,987	73,941	13.5
Axles	80,379	84,585	40.4
Steel car wheels	74,898	77,317	3.1
Sundry steel and iron products	233,070	227,345	2.5*
Total	12,979,282	14,334,412	9.5
Miscellaneous products:			
Zinc	75,074	73,730	1.8*
Sulphate of iron	34,260	29,114	17.7*
Fertilizer—"Duplex basic phosphate"	11,639	21,771	46.5
Fertilizer—Sulphate of ammonia	193,434	194,010	.3
Ammonia (as liquor)	709	664	6.8*
Benzol products	169,603	171,435	1.1
Universal Portland cement	15,425,000	14,526,000	6.2*

*Increase.

Table II.—Foreign and Domestic Shipments and Business

	1927 Tons	1926 Tons	(Increase or Decrease) Tons Per Cent	
Domestic Shipments				
Rolled and finished steel products.....	11,859,548	12,970,877	1,111,329	8.57 Dec.
Pig iron, ingots, ferro and scrap.....	228,028	227,537	491	.22 Inc.
Coal, coke and iron ore.....	564,814	1,104,191	539,377	48.85 Dec.
Sundry materials and by-products.....	129,688	132,024	2,336	1.77 Dec.
Total tons all kinds of materials, except cement....	12,782,078	14,434,629	1,652,551	11.45 Dec.
Universal Portland cement (bbl.).....	15,261,966	15,101,788	160,178	1.06 Inc.
Export Shipments				
Rolled and finished steel products.....	1,133,735	1,327,052	193,317	14.57 Dec.
Pig iron, ferro and scrap.....	6,790	2,887	3,903	135.19 Inc.
Sundry materials and by-products.....	145,571	143,400	2,171	1.51 Inc.
Total tons all kinds of materials.....	1,286,096	1,473,339	187,243	12.71 Dec.
Aggregate tonnage of rolled and finished steel products shipped to both domestic and export trade.....	12,993,283	14,297,929	1,304,646	9.12 Dec.
Total value of business (covering all of above shipments, including cement, railroad and marine equipment delivered and other business not measured by the ton unit):				
Domestic (not including inter-company sales).....	\$784,453,995	\$886,710,521	\$102,256,526	11.53 Dec.
Export	85,781,947	100,426,645	14,644,698	14.58 Dec.
Total	\$870,235,942	\$987,137,166	\$116,901,224	11.84 Dec.

and betterments for which expenditures were made in 1927 were mentioned in THE IRON AGE of Jan. 5, 1928, page 78.

Expenditures and appropriations from earnings for maintenance, depletion, depreciation and amortization amounted to \$172,781,272 in 1927, compared with \$185,231,386 in 1926. Ordinary repairs and maintenance of manufacturing plants took \$108,366,997 of this total in 1927 and \$114,866,352 in 1926. For blast furnace and coke oven relinings \$5,369,448 was expended last year and \$4,693,324 in 1926.

The common stock issue was increased during the year in the amount of \$203,321,000 by a 40 per cent stock dividend declared from undivided surplus and paid on June 1. This brought the common stock to \$711,623,500 and, as the dividend rate of 7 per cent annually was continued on the new issue, the yearly common dividend requirements were increased from

\$35,581,175 to \$49,813,645. With preferred stock dividends of \$25,219,677, total dividends paid or declared during the year amounted to \$75,033,322, which taken from net profits of \$87,896,836 left an addition to surplus of \$12,863,514. In 1926 surplus income amounted to \$55,866,553, of which \$30,000,000 was appropriated for plant improvement and betterments and the remainder added to undivided surplus. On Dec. 31, 1927, undivided surplus stood at \$363,044,914. Comparative income account is shown in Table III.

Employees and Welfare Activities

The average number of employees during 1927 was 231,549, compared with 253,199 in 1926, a decrease of 8.55 per cent. Manufacturing properties required an average of 167,405 employees last year and 183,389 in the previous 12 months. Total wages and salaries in 1927 aggregated \$430,727,005, as against \$467,409,446

Table III.—Comparative Income Account For the Fiscal Years Ended Dec. 31, 1927 and 1926

	1927	1926	+ Increase — Decrease
Earnings—Before charging interest on bonds and mortgages of subsidiary companies:			
First quarter.....	\$47,610,344.88	\$47,155,460.85	+ \$454,884.03
Second quarter.....	48,055,635.44	49,911,150.34	— 1,855,514.90
Third quarter.....	43,355,091.74	54,693,856.01	— 11,338,764.27
Fourth quarter.....	33,294,417.11	55,584,685.98	— 22,290,268.87
Total for year.....	*\$172,315,489.17	*\$207,345,153.18	— *\$35,029,664.01
Less, interest on outstanding bonds and mortgages of the subsidiary companies.....	7,991,113.37	8,286,284.27	— 295,170.90
Balance of earnings.....	\$164,324,375.80	\$199,058,868.91	— \$34,734,493.11
Less, charges and allowances for depletion, depreciation and amortization applied as follows:			
To depletion and depreciation reserves of subsidiary companies	47,390,338.57	53,171,075.95	— 5,780,737.38
To sinking funds on United States Steel Corporation bonds	11,515,668.84	11,049,835.37	+ 465,833.47
Net income in the year.....	\$105,418,368.39	\$134,837,957.59	— \$29,419,589.20
Deduct:			
Interest on United States Steel Corporation bonds outstanding	16,674,175.68	17,228,669.16	— 554,493.48
Premium paid on bonds redeemed by sinking fund:			
On subsidiary companies' bonds.....	320,215.05	255,059.29	+ 65,155.76
On United States Steel Corporation bonds.....	1,078,000.02	987,924.94	+ 90,075.08
Balance	\$87,345,977.64	\$116,366,304.20	— \$29,020,326.56
Add: Net balance of sundry receipts and charges, including adjustments of various accounts.....	550,858.39	301,100.69	+ 249,757.70
Dividends on United States Steel Corporation stocks:			
Preferred, 7 per cent.....	25,219,677.00	25,219,677.00	—
Common, 7 per cent.....	49,813,645.00	35,581,175.00	+ 14,232,470.00
Surplus net income.....	\$12,863,514.03	\$55,866,552.89	— \$43,003,038.86
Less, sums appropriated and expended or to be expended account of additions, improvements or betterments to plants and property.....		30,000,000.00	— 30,000,000.00
Balance carried forward to undivided surplus	\$12,863,514.03	\$25,866,552.89	— \$13,003,038.86

*Balance of earnings after making allowances for estimated amount of Federal income taxes.

in the preceding year, resulting in an average daily earning per employee, exclusive of general administrative and selling forces, of \$5.86 in 1927 and \$5.82 in 1926. Including the administrative and selling forces, the average daily earnings per employee were \$5.99 and \$5.94 respectively.

Expenditures for pensions, housing and welfare, sanitation, accident prevention and other welfare activities were made at about the same rate as in recent years, and are taken up separately in these columns as they are dealt with in the bulletins issued from time to time by the corporation's Bureau of Safety, Sanitation and Welfare.

The number of registered stockholders on Dec. 31, 1927, was 151,596, compared with 143,703 one year ago.

Bethlehem Profits Declined 21.8 Per Cent

Net income of the Bethlehem Steel Corporation in 1927 amounted to \$15,826,142, as compared with \$20,246,167 in 1926, a decline of 21.8 per cent. "The value of orders booked during the year," says this corporation's annual report, "aggregated \$280,199,101, as compared with \$283,707,678 in 1926. Unfilled orders on Dec. 31, 1927, amounted to \$58,609,006, as compared with \$49,912,796 at the end of 1926.

"The construction program together with a better coordination of the various properties acquired from the Lackawanna, Cambria and Midvale companies have been largely responsible for a reduction of \$7.27 per ton in the average cost of producing the finished steel products shipped by the corporation in 1927, as compared with the corresponding average based upon equivalent tonnages of the same products in 1923.

"Unfortunately the economies in production have not resulted in a corresponding increase in the net income of the corporation because, during the same period, the prices of steel products have steadily declined. The average billing price per ton of all rolled steel and other finished products shipped by the corporation during 1927 was \$1.87 less than the corresponding average for 1926 and \$8.60 less than the corresponding average for 1923."

Bethlehem's operations averaged 73.6 per cent of capacity in 1927, as compared with 81.1 in 1926. This resulted in a production of 5,590,754 tons of ingots in 1927 as against 6,162,759 in 1926 and of 4,315,509 tons of pig iron and ferromanganese, as compared with 4,551,353 tons in 1926. Production of rolled and finished products aggregated 4,006,612 in 1927 and 4,337,957 in 1926. Other comparative figures appear in Table VI.

Sharp Decline in Sheet & Tube Earnings

The Youngstown Sheet & Tube Co. had net profits of \$7,023,334 in 1927, as compared with \$15,148,876 in the

Table IV.—Inventories

	Dec. 31, 1927	Dec. 31, 1926
Ores—Iron, manganese and zinc..	\$80,099,036	\$78,369,662
Limestone, fluxes and refractories..	5,686,874	5,149,877
Coal, coke and other fuel.....	12,414,147	14,910,624
Pig iron, scrap, ferro and spiegel..	23,649,267	26,951,753
Pig tin, lead, spelter, copper, nickel, aluminum and dross and skim- mings	10,291,340	11,651,089
Rolls, molds, stools, annealing boxes, etc.	14,591,359	13,921,215
Ingots—Steel	1,513,534	2,000,864
Blooms, billets, slabs, sheet and tin plate bars, etc.	21,803,436	23,612,592
Wire rods	1,617,466	1,619,575
Skelp	1,971,460	2,729,222
Finished products	65,112,328	63,598,782
Manufacturing supplies, stores and sundry items not otherwise classi- fied	31,003,952	35,298,964
Mining supplies and stores (for ore and coal properties).....	4,968,476	5,813,012
Railroad supplies and stores.....	5,971,851	7,141,801
Merchandise of supply companies..	1,691,169	1,951,588
Material, labor and ex- pense locked up in uncompleted bridge, structural and other contract work	\$43,484,055	
Less bills rendered on account	40,309,054	
	3,175,001	1,192,881
Stocks abroad and on consignment	28,863,576	28,345,964
Material in transit.....	4,759,388	7,139,276
Total	\$319,183,660	\$331,398,741
Less, inventory reserve.....	48,015,658	50,143,280
Balance	\$271,168,002	\$281,255,461

previous year, a decline of 53.6 per cent. In commenting upon the decrease President James A. Campbell said in part: "The results of the year's business were not satisfactory, due principally to lower selling prices, reduction in volume, and particularly to the depression in the oil country trade, in which the company is largely interested through the manufacture of tubular products. We have also suffered very materially from lower selling prices of zinc ore, of which the company is a large producer."

Profits Declined Throughout Industry

That the decline in profits during 1927 was general throughout the industry is evidenced by the fact that 20 companies, with a theoretical ingot capacity of 47,908,200 tons, or more than 82 per cent of the country's total rated capacity, earned \$153,574,000 in 1927, as compared with \$207,293,000 in the previous year, a decline of 25.9 per cent. Not including the Steel Corporation, the decline was 27.5 per cent. Of the larger companies, the Inland Steel Co., the American Rolling

Table V.—Comparative Earnings in 1927 and 1926 in Thousands of Dollars

Company	Total Ingot Capacity	1926 Total Stock- holders' Value	1926 Net Profits	1926 Per Cent Earnings to Stock- holders' Value	1927 Total Stock- holders' Value	1927 Net Profits	1927 Per Cent Earnings to Stock- holders' Value	Per Cent Decrease in Profits
American Rolling Mill Co.	1,750,000	\$45,909	\$4,064	8.8	\$47,298	\$3,749	7.9	6.7
Bethlehem Steel Corporation.....	7,900,000	343,143	20,246	5.9	392,283	15,826	4.0	21.8
Central Alloy Steel Corporation.....	1,400,000	63,032	3,331	5.3	62,749	2,726	4.3	18.2
Columbia Steel Corporation.....	203,200	18,569	1,090	5.9	21,187	1,066	5.0	2.2
Crucible Steel Co. of America.....	950,000	102,790	6,548	6.4	105,988	5,617	5.3	14.4
Donner Steel Co., Inc.	540,000	15,492	737	4.7	15,868	372	2.3	49.5
Gulf States Steel Co.	288,000	17,621	800	4.5	17,656	756	4.3	5.5
M. A. Hanna Co.		27,999	1,548	5.4	32,594	1,247	4.1	19.4
Inland Steel Co.	1,800,000	64,830	7,148	11.0	67,120	6,807	10.1	4.8
Interstate Iron & Steel Co.	375,000	9,889	900	9.1	9,788	410	4.2	54.4
Jones & Laughlin Steel Corporation...	3,000,000	155,125	15,149	9.8	163,638	11,239	6.9	25.1
Ludlum Steel Co.	22,000	3,727	286	7.7	3,707	225	6.1	21.3
Otis Steel Co.	421,000	22,091	1,907	8.6	21,407	1,383	6.5	27.5
Republic Iron & Steel Co.	1,300,000	88,562	5,065	5.7	89,836	3,018	3.3	40.4
Sharon Steel Hoop Co.	400,000	15,297	1,296	8.5	15,464	556	3.6	57.1
Superior Steel Corporation.....		4,792	272	5.7	4,914	*190	...	169.8
United States Steel Corporation.....	23,046,000	1,630,447	116,667	7.2	1,692,086	87,897	5.2	24.7
Virginia Iron, Coal & Coke Co.		15,344	84	.6	15,275	*182	...	316.6
Wheeling Steel Corporation.....	1,273,000	74,790	5,006	6.7	76,877	4,029	5.2	19.5
Youngstown Sheet & Tube Co.	3,240,000	122,623	15,149	12.3	131,879	7,023	5.3	53.6
Total	47,908,200	\$2,842,072	\$207,293	7.3	\$2,987,614	\$153,574	5.1	25.9
Total without United States Steel.....	24,862,200	1,211,625	90,626	7.5	1,295,528	65,677	5.1	27.5

*Deficit.

Table VI.—Comparative Production and Other Statistics for Leading Companies in 1927 and 1926

Company	Total Volume of Sales	Gross Earnings	Inventories, As of Dec. 31	Pig Iron Pro- duction, Gross Tons	Steel Ingot Pro- duction, Gross Tons	Finished Steel Pro- duction, Net Tons	Total Payroll	Average No. of Employees	Average Yearly Earn- ings per Employee
U. S. Steel Corporation									
1927.....	\$870,235,942*	\$172,315,489	\$271,168,002	13,784,226	18,486,444	12,979,282	\$430,727,095	231,549	\$1,860
1926.....	987,137,166*	207,345,153	281,255,461	15,705,301	20,306,668	14,334,412	467,409,446	253,199	1,846
Bethlehem Steel Corpora- tion									
1927.....	271,502,892	40,378,900	67,695,369	4,315,509	5,590,754	4,006,612	111,193,699	61,978	1,794
1926.....	304,361,805	45,405,253	68,438,649	4,551,353	6,162,759	4,337,957	121,891,931	66,072	1,845
Youngstown Sheet & Tube Co.									
1927.....		22,923,265	52,879,232						
1926.....		33,139,007	49,513,567						
Jones & Laughlin Steel Corp.									
1927.....		16,559,320	30,210,301	2,054,615	2,348,719	1,937,645†	44,388,949	21,810	2,035
1926.....		21,210,206	32,911,098	2,246,054	2,591,140	2,136,141†	49,037,542	23,760	2,064
Inland Steel Co.									
1927.....		11,342,054	12,935,618						
1926.....		11,180,782	12,537,329						
American Rolling Mill Co.									
1927.....	39,087,519	8,931,293	13,558,048					9,760	
1926.....	35,392,968	8,154,905	12,445,330					7,279	
Republic Iron & Steel Co.									
1927.....	44,550,040	6,037,862	13,521,192	846,253	820,680	755,398	17,487,442	10,125	1,727
1926.....	53,890,445	8,442,681	13,017,883	914,655	949,018	864,195	20,008,683	11,481	1,743
Central Alloy Steel Corp.									
1927.....		5,721,950	14,726,287	452,282	948,778	788,361	19,379,822	9,559	2,027
1926.....			17,000,719	262,423	1,941,800	948,166	19,839,532	10,063	1,972
Wheeling Steel Corpora- tion									
1927.....	72,596,950	9,521,099	25,684,633	821,215	1,147,867		27,756,135	15,593	1,780
1926.....	83,427,942	10,612,122	25,369,181	709,950	1,242,971		31,433,262	17,249	1,822

*Not including Inter-company sales.
†Shipments.

Mill Co. and the Gulf States Steel Co. were the only ones reporting a decline of less than 10 per cent.

On a total stockholders' investment, including common and preferred stock and surplus of \$2,987,614,000,

these 20 companies in 1927 earned 5.1 per cent, as against 7.3 per cent on a stockholders' investment of \$2,842,072,000 in 1926. Comparative figures of these companies for the two years are shown in Table V.

ASK RATE MODIFICATION

Chicago District Steel Makers Seek Reconsideration of Consolidated Southwestern Decision

WASHINGTON, March 20.—Independent steel producers in the Chicago district, following similar action by other steel makers, last Wednesday filed a petition with the Interstate Commerce Commission asking that it reopen or modify its decision in the Consolidated Southwestern cases. It is contended that the decision fails to include a complete list of iron and steel products moving to the Southwestern destination territory involved and thus places a restriction on the free movement of such traffic. Objection is made also on the grounds that the scale prescribed is improper, unduly excessive and detrimental to iron and steel commerce. It is contended that it is improper to relate rates upon carload iron and steel traffic to class rate scales because of the widely different circumstances in transportation conditions governing the two classes of movement. Rates constructed upon consideration of distance alone are held to be restrictive to the free movement of heavy and bulky commodities such as iron and steel.

The scale provided, it is charged, unduly disrupts relationships of long standing between competitive producing points and will destroy commerce. Large markets, it is stated, will be diverted to foreign interests, and the movement of iron and steel traffic from the principal producing points of the United States will be revolutionized.

Railroads Also Object to Scale

From the carriers' standpoint, it is declared, a large volume of business which at present moves by rail from such points as Chicago, Cleveland and Youngstown to Southwestern territory will be diverted to mills situated at points available to barge or vessel movement, depriving rail carriers of substantial revenue. The purpose of the increased rates, it is stated, will be defeated as a result of this diversion of markets and tonnage.

Concurring in the view of other petitioners for reopening of the case on the principle of insufficient

evidence, the Chicago producers also maintain that the revenue contributed by the iron and steel traffic is greatly in excess of revenues from general traffic. Consequently, it is stated, revenues derived from iron and steel traffic under the Southwestern scale would be greatly in excess of reasonable revenues and contrary to the intent of the Hoch-Smith resolution.

The petitioners include the Acme Steel Co., Clayton Mark & Co., the Crane Co., the Inland Steel Co., the Interstate Iron & Steel Co., Joseph T. Ryerson & Son, Inc., the Youngstown Sheet & Tube Co. and the North Western Expanded Metal Co.

Steel products which, it is asserted, are not included in the decision, but should be, are chain, concrete road joints, rails and fastenings in mixed carloads, strip steel, stays, box strap, bale tie buckles, wood joint fasteners, expanded metal ribbing lathing, corner bead clips, coiling or roofing clips, cove base fastenings, tin and terne plate, concrete and plaster reinforcement, wire mesh and expanded metal, wrought conduit pipe, building doors other than rolling, concrete road points and joists, studding, iron or iron-body valves, siding, traps and steam or oil separators.

Secretary of War Opposes Bill to Prohibit Export of Munitions

WASHINGTON, March 20.—The resolution of Representative Burton of Ohio to prohibit export from the United States of war munitions is so broad that it might endanger the maintenance of an adequate American munitions industry, Secretary of War Davis told the House Committee on Foreign Affairs last Thursday. Members of the committee dissented from the view of the Secretary of War, but the latter insisted that the resolution as drawn might apply not only to munitions as such but also to products such as steel, cotton, and copper, used in the manufacture of the finished product. Secretary Davis also recalled the position taken by President Wilson during the World War that it would be a violation of neutrality to prohibit munition shipments to the Allies. This was in response to the effort to put through an embargo on shipments of munitions.

European Markets Are Less Active

Steel Prices Still Firm—Germany to Eliminate Export Rebates
—British Advance Pig Iron

(By Cable)

LONDON, ENGLAND, March 19.

CLEVELAND producers have increased foundry and forge iron prices by 1s. (24c.) per ton, as most of the current output is sold for two months forward and some contracts have been made for delivery up to September. The rise in prices brought out increased buying, especially by domestic consumers, as foreign pig iron is not competitive.

Hematite iron is steadier, but stocks are still heavy and makers are seeking orders. Foreign ore continues firm as a result of the Swedish strike. British demand for ore is poor, but German consumers are purchasing for early shipment.

Finished steel is generally quiet for export, but in the domestic market there is a good volume of structural and engineering orders. Plate mills are in need of orders, but consumers are not attracted by the rebate plan.

Tin plate is strong and active. The Asiatic Petroleum Co. has purchased 1,000,000 boxes for third quar-

ter delivery and other consumers are showing marked interest. The larger makers are sold out until the end of June and have booked one-third of their output for the rest of the year. Makers have agreed not to accept orders at less than 18s. (\$4.39) per base box, although the minimum price continues at 17s. 9d. (\$4.33) per base box, f.o.b. works port. Some oil tin plate business has been done at 18s. 3d. (\$4.45) per base box.

Galvanized sheets are inactive and the market is weak. Black sheets continue quiet.

The Australian Iron & Steel Co. has been formed by Dorman, Long & Co., Baldwins, Ltd., Howard Smith of Melbourne and the Hoskins Iron & Steel Co., with capital of £5,000,000, to develop an Australian iron and steel industry at Port Kembla.

Continental iron and steel is generally quiet, although British consumers have bought fair tonnages of billets and wire rods. The European Rail Makers' Association will meet in Paris, March 29. Negotiations are proceeding for reorganization of the International Wire Rod Syndicate.

GERMANY-TO SEEK EXPORTS

Decline in Domestic Trade Expected—Mills to Eliminate Export Rebates—Shipyards Active

BERLIN, GERMANY, March 4.—The industrial situation is still satisfactory. Steel works are well booked with business for delivery into the second quarter, the number of unemployed has been declining for several weeks, and there was a recession in bankruptcies in February. According to the Institute for the Study of Trade Fluctuations, however, the intense industrial activity carried over from last year began to slacken in February. The decline in business, however, is expected to develop slowly and will be accompanied by increased German competition for export business. There is some labor unrest, and, following rejection by labor representatives of a compromise, the Siemens, Bergmann and the Mix und Genest companies in Berlin have suspended operations, releasing about 50,000 workmen.

Price disagreement between steel producers and consumers, which recently culminated in an advance by the steel syndicate, has been terminated. The Ministry of Industry has withdrawn an ordinance which brought the steel syndicates under the price-regulation provisions of the cartel law. This ordinance required the syndicates to report to the Government all price changes or agreements before they became effective. The steel producers have reached an agreement with the Ministry of Industry, under which the spread between domestic and export prices is to be gradually decreased until it disappears. This change, it is believed, will remove the principal grievance of consumers, who contend that the consumption of finished steel products in the domestic market is continually checked by high prices.

The Pig Iron Syndicate has made no change in prices for March. Domestic business has improved, but exports of pig iron are light. The ingot steel syndicate has made no change in domestic prices for March, but has increased its "world market" prices, so that rebates

British and Continental European prices per gross ton, except where otherwise stated, f.o.b. makers' works, with American equivalent figured at \$4.87 per £ as follows:

Durham coke, del'd.	£0 18s.			\$4.39	
Bilbao Rubio ore*	1 1 1/4	to £1 2s.		5.30	to \$5.36
Cleveland No. 1 fdy.	3 8 1/2			16.56	
Cleveland No. 3 fdy.	3 6			16.07	
Cleveland No. 4 fdy.	3 5			15.83	
Cleveland No. 4 forge	3 4 1/2			15.71	
Cleveland basic (nom.)	3 15	to 3 15 1/2		18.27	to 18.39
East Coast mixed	3 10			17.05	
East Coast hematite	3 10 1/2			17.17	
Rails, 60 lb. and up.	7 15	to 8 0		37.75	to 38.96
Billets	6 0	to 6 10		29.22	to 31.66
Ferromanganese	13 10			65.75	
Ferromanganese (export)	13 0	to 13 5		63.31	to 64.53
Sheet and tin plate bars, Welsh	5 7 1/2	to 5 15		26.18	to 28.01
Tin plate, base box.	0 18	to 0 18 1/4		4.39	to 4.45
Black sheets, Japanese specifications.	13 5	to 13 10		64.53	to 65.75
Ship plates	7 12 1/2	to 8 2 1/2		1.66	to 1.77
Boiler plates	9 2 1/2	to 9 12 1/2		1.98	to 2.09
Tees	8 2 1/2	to 8 12 1/2		1.77	to 1.89
Channels	7 7 1/2	to 7 17 1/2		1.60	to 1.71
Beams	7 2 1/2	to 7 12 1/2		1.55	to 1.66
Round bars, 3/4 to 3 in.	7 5	to 7 15		1.58	to 1.69
Steel hoops	10 10	to 11 0		2.28	to 2.39
Black sheets, 24 gage	10 0	to 10 5		2.17	to 2.23
Galv. sheets, 24 gage	13 2 1/2			2.85	
Cold rolled steel strip, 20 gage, nom.	14 0	to 14 5		3.04	to 3.10

*Ex-ship, Tees, nominal.

Continental Prices, All F. O. B. Channel Ports

(Per Metric Ton)					
Foundry pig iron: (a)					
Belgium	£3 4s.	to £3 5s.	\$15.58	to \$15.83	
France	3 4	to 3 5	15.58	to 15.83	
Luxemburg	3 4	to 3 5	15.58	to 15.83	
Basic pig iron (nom.):					
Belgium	3 0	to 3 1	14.61	to 14.85	
France	3 0	to 3 1	14.61	to 14.85	
Luxemburg	3 0	to 3 1	14.61	to 14.85	
Coke	0 18		4.39		
Billets:					
Belgium	4 14		22.90		
France	4 14		22.90		
Merchant bars:					
Belgium	5 6		1.17		
France	5 6		1.17		
Luxemburg	5 6		1.17		
Joists (beams):					
Belgium	4 17		1.07		
France	4 17		1.07		
Luxemburg	4 17		1.07		
Angles:					
Belgium	5 5		1.16		
1/4-in. plate:					
Belgium (a)	6 10		1.44		
Germany (a)	6 10		1.44		
3/8-in. ship plates:					
Belgium	6 6		1.39		
Luxemburg	6 6		1.39		
Sheets, heavy:					
Belgium	6 1		1.34		
Germany	6 1		1.34		

(a) Nominal.

to domestic manufacturers for export are to that extent reduced. This is a result of the recent strength of prices in other Continental producing countries. The rebate on steel bars manufactured into export products has been reduced by about 10m. (\$2.39) per ton. The new steel ingot price is 79m. (\$18.88) per ton, compared with 100m. (\$23.90) per ton on domestic sales. Blooms are quoted at 84m. (\$20.08) per ton, compared with 107.50m. (\$25.69) per ton in the domestic market; slabs, 96m. (\$22.94), compared with 120m. (\$30.68) per ton; medium gage sheets, 130m. (\$31.07), compared with 155m. (\$37.05) per ton.

The price spread between home and export prices is still large, and producers declare that the rebate system cannot be continued much longer and that the International Steel Cartel should take more effective action in raising Continental prices. Both output and sales of steel were slightly smaller at the beginning of March. Rolling mills are still well booked with business in bars, heavy-gage sheets and wire rods, but demand for structural material and medium and light-gage sheets is less active. Buying by German railroads has slackened considerably. Deliveries, however, are still extended. The average delivery offered on pig iron and steel ingots is two months, on steel bars two to three months and on light-gage sheets one to two months. The present decline in domestic buying is partly explained by the heavy purchases by consumers last fall, when a strike or lockout in the steel industry was believed imminent.

Export demand for iron and steel has been extremely active, but much of the recent purchasing was seasonal and a decrease in this business is expected. Imports of steel have increased slightly as a result of the extended deliveries quoted by domestic steel mills. Exports of semi-finished products are large and prices are firm. Demand for light railroad materials is better than for the heavier products, and there is heavy inquiry for bands, the price of which has advanced.

The Solingen steel industry reports considerable improvement, although manufacturers are suffering from an acute shortage of working capital and are encountering difficulty in paying wages. This is a result of the demand for long-term credits from customers. There is continued improvement in exports of Solingen cutlery and high-grade steels, despite strong competition from Sheffield. Exports to Switzerland, which normally buys about 50 per cent of its requirements of cutlery and special steels from Germany, are quite active.

Shipyards are prosperous. The Germanische Lloyd annual report records a total of 524,991 gross tons of construction registered in 1927, compared with 372,681 tons in 1926. Motor ship construction totaled 277,400 gross tons, while steam construction amounted to only 246,671 tons. This is the first year in which motor ship construction was in excess of steam vessel building. Of all the 1927 construction, 35 per cent represented foreign orders.

United States Second Largest Buyer of German Hoops

HAMBURG, GERMANY, March 3.—The United States has become Germany's second largest market for hoops. In 1927 exports from Germany totaled 129,204 metric tons, compared with 131,597 tons in 1926. Great Britain was the largest purchaser of German hoops, with 38,243 tons in 1927, and the United States was next with 18,083 tons, of which the greater portion was in cotton ties. Germany imported almost exactly as much as was exported, imports for 1927 totaling 129,209 metric tons, mostly from the Saar.

German Direct Steel Process Reaches Practical Stage

LONDON, ENGLAND, March 10.—The discovery of the Hoesch Steel Works (Germany), first announced a few months ago, by which it is claimed steel can be produced direct from ore, has now passed the laboratory tests and reached a practical stage. A plant is in process of erection and will be ready for operation next June. It is stated that this new method will reduce costs of steel production approximately 30 per cent.

JAPANESE BUYING RAILS

Small Inquiries in Market—Steel Importers in New York Report Improvement

NEW YORK, March 20.—Except for some pending rail business the Japanese market is quiet. Yokohama municipality opens bids March 23 on 10 miles of 91-lb. high T-rails and three miles of 136-lb. T-rails. Tokio municipality has taken bids on six miles of 122-lb. grooved rails and one mile of 140-lb. guard rails. An inquiry from the South Manchuria Electric Co., Dairen, Manchuria, for 290 tons of 91-lb. high T-rails is understood to have been awarded to a Japanese export house in New York for execution by an American mill.

The Chinese market is quiet. Chinese merchants continue to offer \$27.50 to \$28 per ton, c.i.f. Chinese port, for second-hand material and plate cuttings, but, as this figures back to a price equivalent to no more than the domestic market on heavy melting steel, very little business can be done. Some wire shorts have been sold, but Chinese offers on this material are also low. Recently an exporter in New York received a firm offer from China of about 25c. per base box under the current American mill quotation on about 1000 double boxes of tin plate.

New York importers of European steel report a moderate volume of interest on the part of consumers, but few sales have been made. A small tonnage of reinforcing bars for a sewer project in the New York district is being bid on. Prices of Continental material are high, and importers, in most cases, are quoting 1.65c. to 1.75c. per lb. on structural material and 1.75c. to 1.85c. per lb. on plain steel bars, duty paid, Atlantic port. Steel hoops are offered at about 2.15c. per lb., duty paid, New York.

Luxemburg's Exports to South America Improving

LUXEMBURG, March 6.—As a result of increases in German export prices, both French and Luxembourg mills have been enabled to advance their quotations. Export to the Far East continues difficult, with Japanese steel producers offering keen competition in their domestic market and with China still inactive as a result of the political situation. Business with South American markets, however, has improved, and there has been a slight revival of trade with the United States.

February has been more active than January, although prices have been reduced from the prohibitive levels of a few weeks ago. There is considerable confusion in the semi-finished material market. Few mills are able to offer early deliveries, and German sellers are quoting high prices. Most producers are booked with tonnage until May. Billets are held at £4 12s. to £4 15s. (\$22.41 to \$23.14) per ton, f.o.b. Antwerp, and blooms have been offered as high as £4 14s. (\$22.90) per ton. Beams are quoted at £4 15s. 6d. to £4 17s. per ton (1.05c. to 1.07c. per lb.), and steel bars at £5 7s. to £5 7s. 6d. per ton (1.18c. to 1.19c. per lb.), f.o.b. Antwerp.

January production of pig iron totaled 229,602 metric tons, and there were 38 out of 47 furnaces in blast on Feb. 1. Steel ingot output in January was 212,938 metric tons.

Copper-Bearing Steel Scrap Causes Trouble in Germany

HAMBURG, GERMANY, March 3.—Copper-bearing steel in Germany (containing 0.2 to 0.75 per cent copper) is causing difficulties when it returns to industry in the form of scrap. A fair tonnage of such steel is beginning to appear on the scrap market, and the small percentage of copper that it contains renders it difficult for scrap dealers to classify it as an alloy, so that it has been delivered to mills as copper-free. Mills and dealers are endeavoring to work out a plan for its classification so that there will be no adverse effects from using it unintentionally.

Machinery Markets and News of the Works

PRICE TENDENCY HIGHER

Milling Machines, Shapers and Radial Drills Have Been Advanced

Business in Machine Tools Continues Moderately Active—Large Orders Placed at Chicago

PRICE advances have been announced by a number of machine tool manufacturers. Radial drill companies have generally followed the lead of a Cincinnati maker in putting up prices and in introducing a new method of quoting whereby the diameter of the column as well as of the length of the arm enters into the price, so that there are two or three prices for each arm length. The new prices on radial drills range from 8 to 30 per cent higher. Shapers have been increased in

price about 8 per cent and some makers of milling machines have named higher prices.

Machine tool buying continues moderately active and indications are that sales for this month will equal, and perhaps exceed, those of February. At Chicago, the International Harvester Co. has bought \$140,000 worth of equipment for its Rock Island, Ill., plant, and the Allis Chalmers Mfg. Co., Milwaukee, has bought about \$40,000 worth. Among the pending projects in the Detroit district is a lot of special machines calling for an expenditure of about \$400,000. The Apex Electric Mfg. Co., Cleveland, and the Champion Spark Plug Co., Toledo, have been among the larger buyers in the Cleveland district. The Mergenthaler Linotype Co., Brooklyn, and the Wright Aeronautical Corporation, Paterson, N. J., continue their purchases in the New York market. The Theodore A. Crane's Sons Co., Brooklyn, has bought 14 tools for its shipyard.

New York

NEW YORK, March 20.

ACTIVE demand for machine tools continues from industrial users and the railroads are beginning to show some interest in new shop equipment. Advances in prices are appearing in some branches of the industry. Shapers have been increased in most cases about 8 per cent, some makers of milling machines have made slight advances and, following the increase in lathe prices about the first of the year, lathe accessories have been advanced from 8 to 12 per cent. Radial drill prices are up from 8 to 30 per cent. Manufacturers of radial drills are quoting on a new basis, the diameter of the column being considered as well as the length of the arm, so that there are two or three prices for each arm length, depending upon whether the column is small, medium or large size. Tables are no longer included in the price of the drill, but are quoted separately.

Among the railroads, the Lehigh Valley is reported still preparing a short list of machine tool requirements. The New York Central, which has not been a purchaser of tools since the first of the year, placed some orders last week. The Western Railway of Alabama has closed on a 13 x 30-in. Pratt & Whitney lathe. The Atlanta & West Point Railroad Co. and the Central of Georgia have each closed on a Niles 48-in., 500-ton, double end wheel press and the former has also purchased a Niles No. 3 axle lathe. The Merchants Despatch Transportation Co., Rochester, N. Y., has purchased a No. 3 die sinking machine.

The Mergenthaler Linotype Co., Brooklyn, has made some further purchases of machine tools. The Wright Aeronautical Corporation, Paterson, N. J., is awaiting a further appropriation before making additional purchases. A recent purchase of about 14 tools by Theodore A. Crane's Sons Co., Brooklyn, included new and used engine lathes, a used planer, new shapers and radial drills.

Other purchases of machine tools included the following: An Indiana manufacturer, 6-in. vertical shaper, 13 x 30-in., 13 x 36-in. and 20 x 48-in. lathes and No. 2 jig boring machine from Pratt & Whitney Co.; a company in Hartford, Conn., an engine lathe; an electrical manufacturer, 12-in. vertical shaper; a Cleveland manufacturer, rebuilt Pratt & Whitney 14-in. grinder; a company in Pennsylvania, hob and cutter grinder; a manufacturer in western Pennsylvania, 16 x 60-in. lathe and a No. 2 jig boring machine; a Connecticut manufacturer, 1100-lb., single frame Niles steam

hammer; a Pittsburgh company, Long & Allstatter type E single vertical punch; a manufacturer of drills, Mitts & Merrill No. 4 giant keyseater; a Wisconsin motor manufacturer, 3-ft. Morris radial drill; a Pittsburgh company, used 18-in. x 8-ft. La Blonde lathe and used 26 x 17-ft. Pond lathe; a California company, No. 2 G Brown & Sharpe automatic cutting off machine; Harrisburg Light & Power Co., Harrisburg, Pa., 3½-ft. heavy-duty Morris radial drill, and Pratt & Whitney Aircraft Co., three United States pedestal tool grinders.

A stock issue to total about \$2,200,000, is being arranged by Warner-Quinlan Co., 26 Beaver Street, New York, operating oil and asphalt refining plants, with main refinery in the Raritan River section, New Jersey, a considerable portion of proceeds to be used for extensions and betterments to double present capacity, including storage and distributing facilities.

J. Edward Birmingham, 45 Warburton Avenue, Yonkers, N. Y., architect, has plans ready for bids for a two-story automobile service, repair and garage building, 88 x 100 ft., at 5120 Broadway, New York, to cost about \$100,000 with equipment.

Quartermaster supply officer, United States Army, Brooklyn, will receive bids until April 2 for one feed water heater, two boiler feed pumps, two 35-hp. steam boilers, and two ammonia compressors, 5 and 7½-tons, respectively, circular 162.

Orange & Rockland Electric Co., Monroe, N. Y., is disposing of bond issue of \$1,250,000, a portion of proceeds to be used for extensions and improvements, including transmission line construction.

New York Edison Co., 130 East Fifteenth Street, New York, plans a new power substation at Laconia Avenue and Gun Hill Road, to cost \$100,000 with equipment. T. E. Murray, 55 Duane Street, is architect.

Louis Shiffman, 1885 Prospect Avenue, Brooklyn, manufacturer of lighting fixtures, has filed plans for a one-story factory, 45 x 105 ft., to cost about \$21,000 with equipment. Kavy & Kavovitt, 350 Stone Avenue, are architects.

Packard Motor Service Co., 206 South Broadway, Yonkers, N. Y., has awarded general contract to F. C. Berube, 418 West 260th Street, New York, for a two-story addition to its service and repair building, to cost close to \$85,000 with equipment. William P. Katz, 45 South Broadway, is architect.

Signal corps procurement district, Governor's Island, N. Y., is asking bids until April 3 for 1500 steel spools, circular 134.

Federal-New York Co., Inc., Goshen, N. Y., is concluding negotiations for purchase of Goshen Illuminating Co., operating artificial gas plant and system. New owner contem-

plates addition in gas-generating facilities, new storage holder and extensions in system.

International Nickel Co., 67 Wall Street, New York, is arranging an expansion and improvement program at its Port Colborne, Ont., properties to cost \$12,000,000. Work will include immediate installation of hoisting machinery, air compressors and auxiliary mining machinery, and additional equipment for hydroelectric power development. Later an addition will be built to electrolytic refinery at Port Colborne and other smelter development carried out. A new electrolytic copper refinery is contemplated at Copper Cliff, Ont., not included in above estimate of cost. Robert C. Stanley is president.

Otis Elevator Co., Eleventh Avenue and Twenty-sixth Street, New York, has awarded a general contract to Turner Construction Co., Graybar Building, for a two-story addition to plant at Yonkers, N. Y., to cost approximately \$100,000 with equipment. W. O. Moyer is engineer in charge of construction.

Continental Baking Corporation, 255 Madison Avenue, New York, has approved a fund for extensions and betterments in different plants, including installation of ovens, power equipment, conveying machinery, electric mixing equipment and other apparatus.

New York Dock Co., 44 Whitehall Street, New York, has awarded general contract to William E. Anderson, Inc., 885 Flatbush Avenue, Brooklyn, for a three-story addition to its factory and terminal at foot of Joralemon Street, Brooklyn, to cost about \$85,000.

Town Council, Belleville, N. J., has plans for a one-story municipal machine and repair shop to cost about \$20,000 with equipment. Paul B. West, 24 Commerce Street, Newark, is architect.

Chamber of Commerce, Paterson, N. J., is negotiating with an aircraft manufacturing company, name temporarily withheld, to establish a local plant. Works will include parts and assembling departments, motors to be purchased from Wright Aeronautical Corporation. Reuben H. Reiffin, 152 Market Street, Paterson, is corporate representative for company.

Raymond N. Burke, Newark, has leased property at 15 Coates Street and will remodel for a brass foundry.

Kantor Brothers, Inc., 205 Waverly Avenue, Newark, plumbing equipment and supplies, has acquired adjoining property, 90 x 122 ft., improved with several buildings, and will use for expansion. Site has been used by Cook & Genung Co., building materials, which will build a new plant and yard on property lately purchased at Irvington.

Public Service Electric & Gas Co., Public Service Terminal Building, Newark, has authorized immediate work on different features of construction and improvement program to cost \$22,000,000, including transmission line and power substation construction to cost more than \$10,000,000; underground conduit electric lines to cost \$500,000; switching stations, distributing facilities, etc. Nathaniel A. Carle is vice-president in charge of operation.

Barozzi Drying Machine Co., 940 Van Wagenen Avenue, North Bergen, N. J., has asked bids on general contract for a two-story and basement addition, 50 x 100 ft., to cost approximately \$65,000. P. O. Simone & Co., 22 Journal Square, Jersey City, N. J., are architects.

New England

Boston, March 19.

MACHINE tool houses report little business transacted the past week and a decrease in new inquiries. The most important sales were a new boring mill and a 20-in. Pratt & Whitney lathe to two Connecticut manufacturers, and some radial drills, details of which are withheld: a used boring mill, used 20-in. motor-driven drill, 3-hp. Blount grinder to local shops; two 16-in. and one 20-in. drill to Massachusetts plants; and a two-spindle drill to a Vermont user. The situation is not as quiet as it might appear, however. Dealers are still negotiating on a large amount of machinery, inquiries for which have been out for several months in some instances. General opinion is that industry, particularly as it pertains to the metal-working trade, will show a slow but steady expansion.

Small tool business is spotty and March sales are a shade below those of February. Recent sales included a measuring machine costing \$1,600.

March report of Worcester Bank & Trust Co. states that since the first of the year a marked improvement has been shown in activities of Worcester manufacturers. A large majority of mills, shops and factories had much better busi-

ness in January and February than in November and December, and more than in first two months of 1927.

Some large Fitchburg manufacturers of machine equipment are operating on a day and night basis. Increased production is partly due to manufacture of a new automobile gear.

Plans are in progress for a new factory for Massachusetts Electro Mfg. Co., 11 Margin Street, Lynn, Mass., to replace one recently damaged by fire.

Bids close March 26 on a three-story and basement, 68 x 93-ft., junior high school at Providence, R. I., to contain metal-working shops. T. J. H. Pierce, city engineer, has plans.

L. C. Titus, 50 Lincoln Street, Watertown, Mass., architect, is taking bids on a one-story, 80 x 200-ft. manufacturing plant for Peerless Pressed Metal Corporation, 14 Electric Avenue, Brighton district, Boston.

Foundations are going in for a one-story, 60 x 160-ft. plant at Millbury, Mass., for New England High Carbon Wire Co., of which Frank Kilmer is president. Plans are private.

Work has started on a one-story, 50 x 85-ft., automobile repair shop for Cambridge Auto Forge, Sidney Street, Cambridge, Mass. E. T. P. Graham, 171 Newbury Street, Boston, is architect.

Plans are in progress for doubling output of airplane engines by Pratt & Whitney Aircraft Co., Hartford, Conn. Government orders on hand will keep present day shift of 400 men and night shift of 200 men busy for two years.

Plans have been approved by Boston Rubber Shoe Co., Malden, Mass., for electrification of mills at Malden and Melrose, replacing steam-power apparatus heretofore in service.

New England Water, Light & Power Associates, Inc., Providence, R. I., recently organized with capital of \$4,000,000, is disposing of a preferred stock issue of \$750,000, a portion of proceeds to be used for property purchases, transmission line construction, etc.

E. M. Jennings, 27 Harrison Street, Bridgeport, Conn., and associates, plan construction of a multi-story automobile service, repair and garage building to cost \$100,000 with equipment.

Boston & Maine Railroad Co., North Station, Boston, will soon begin construction of a new boiler house at Westboro, N. H., to cost more than \$55,000 with equipment.

Arlington Gas Light Co., 589 Massachusetts Avenue, Arlington, Mass., will soon begin construction of a one-story heater and governor plant unit reported to cost in excess of \$50,000.

Board of Education, Bridgeport, Conn., has approved installation of manual training shops in basement of new three-story Bassick junior high school, for which bids will be received on general contract March 27. Structure will cost in excess of \$400,000. Ernest G. Southey, Bridgeport, is architect.

Edison Electric Illuminating Co., 39 Boylston Street, Boston, has filed plans for a one-story repair shop and automobile service building, to cost close to \$70,000 with equipment.

United States Gypsum Co., Chicago, has purchased property with water frontage at Charlestown, formerly occupied by Philadelphia & Reading Coal Co., and contemplates erection of 12 plant units. Handling equipment will be required.

Gulf States

BIRMINGHAM, March 19.

ARRANGEMENTS have been made by San Antonio Public Service Co., San Antonio, Tex., for acquisition of Comal Power Co., New Braunfels, Tex. Purchasing company will carry out an expansion program, including installation of 30,000-kw. turbo-generating unit and auxiliary equipment, and will make extensions in transmission lines. Company has approved bond issue of \$7,500,000, a portion of fund to be used in connection with purchase of property and additions. James Lawrence is vice-president.

Hahn & Clay Co., 102 Milan Street, Houston, Tex., has completed plans for a one-story machine and forge shop, 95 x 115 ft., to cost close to \$20,000 with equipment.

Interstate Cotton Oil Refining Co., Sherman, Tex., is considering construction of a one-story addition, to cost close to \$45,000 with equipment. It is proposed to establish department for manufacture of containers.

New Orleans Public Service Co., New Orleans, has approved plans for construction of 22-in. diameter natural gas pipe line from Destrahan to New Orleans, to cost \$275,000 with booster stations, etc.

Board of Education, Fairfield, Ala., is considering installation of manual training equipment in three-story high school

to cost \$150,000. Denham, Vankeuren & Denham, Age-Herald Building, Birmingham, are architects.

Board of Education, Alamo Heights, Tex., is planning installation of manual training equipment in one-story junior high school to cost \$175,000, for which plans will be drawn by H. P. Smith, National Bank of Commerce Building, San Antonio, Tex., architect.

Ovens, power equipment, conveying and other machinery will be installed in new plant, 100 x 100 ft., to be erected by Schepps Baking Co., Fort Worth, Tex., to cost \$200,000 with machinery.

National Cast Iron Pipe Co., Birmingham, will soon begin a one-story foundry addition, to cost in excess of \$50,000 with equipment.

J. A. Burke, 3217 Cadiz Street, New Orleans, is planning purchase of machinery for production of cement roofing tile.

United Shutter & Awning Co., 801 First National Bank Building, Fort Lauderdale, Fla., is planning establishment of a local plant. Installation will include a punch and shear, band saw and wood-working machinery.

Board of Regents, University of Texas, Austin, Tex., is considering a fund of \$8,000,000 for new buildings, including mechanical engineering and shop building, \$350,000; electrical engineering building, \$350,000; aeronautical building, \$350,000; general shops, \$200,000; chemical building, with laboratories, etc., \$900,000; additions and improvements in power house, grounds and various operating buildings, \$750,000. Edward Crane, Dallas, is a member of board. Herbert M. Greene Co., Construction Industries Building, Dallas, is architect.

Magnolia Gas Co., operated by Magnolia Petroleum Co., Magnolia Building, Dallas, Tex., is reported planning installation of a pipe line from Wheeler County gas field to Fort Worth, Tex., for natural gas supply, to cost more than \$2,000,000.

Southwestern Gas & Electric Co., Marshall Street, Shreveport, La., is said to be considering construction of steam-operated electric power plant in northern part of State, to cost more than \$1,000,000 with transmission lines.

J. D. Wrather, Amarillo Building Amarillo, Tex., is at head of project to construct and operate an oil refinery at Pyote, Tex., to cost more than \$100,000. A company will be formed to carry out work.

Texarkana Water Corporation, Texarkana, Tex., is planning extensions and improvements in plant and system, including installation of a new pumping station with capacity of 2,000,000 gal. per day. Total program is estimated to cost close to \$250,000.

Philadelphia

PHILADELPHIA, March 19.

PLANs have been filed by board of trustees, Mount Sinai Hospital, Philadelphia, for a steam power house to cost approximately \$50,000 with equipment. Magaziner, Eberhard & Harris, 603 Chestnut Street, are architects.

U. S. M. C. Garages, Inc., 1401-7 Locust Street, Philadelphia, plans a three-story addition to service, repair and garage building to cost about \$110,000 with equipment.

Tidewater Oil Sales Co., 11 Broadway, New York, has filed plans for a one-story storage and distributing plant, to cost about \$35,000 with equipment.

United Gas Improvement Co., Broad and Arch Streets, Philadelphia, is arranging a construction and improvement program for Philadelphia Gas Works, an affiliated organization, to cost approximately \$2,000,000 with equipment. Work will include expansion at gas-generating station at Richmond and Tioga Streets to cost \$380,000, including completion of new gas holder; installation of new metering equipment to cost \$92,000; installation of gas-pumping and coal-handling equipment at Point Breeze station to cost \$130,000; extension of distributing lines and mains to cost in excess of \$1,000,000 with equipment. Koppers Co., Pittsburgh, will proceed with construction of new gas-generating and by-products coke plants for Philadelphia Gas Co., on 60-acre tract for which plans have been filed, to cost approximately \$7,000,000 with machinery.

David Supowitz, 929 Chestnut Street, Philadelphia, architect, has plans for a two-story automobile service, repair and garage building, 74 x 200 ft., to cost in excess of \$100,000 with equipment.

In connection with an expansion program in Philadelphia district to cost \$9,000,000, Bell Telephone Co. of Pennsylvania, Philadelphia, has arranged an appropriation of \$1,948,000 for purchase of new equipment, cables, conduits, manholes, manhole covers, etc., and \$1,422,000 for underground cable installation.

Ryan Monoplane Co., St. Louis, has concluded negotiations for lease of Phillips tract, Camden, N. J., comprising 245 acres, as site for a new aviation field. Work will soon begin on hangar to house six airplanes, with repair and re-

conditioning shops, oil storage and distributing station, etc.

Campbell Soup Co., Camden, N. J., has begun erection of new plant to double present canning and distributing capacity. Project will include a new steam power plant and will cost close to \$2,000,000. Harry A. Kelleher is superintendent.

County Board of Education, West Chester, Pa., C. T. Saylor, superintendent, is considering installation of manual training equipment in new high school to be erected at Lynhurst for West Grove, Avondale and London Grove townships, for which plans are nearing completion. A fund of \$600,000 is available for structure.

Metropolitan Edison Co., Reading, Pa., is disposing of bond issue of \$23,000,000, a portion of proceeds to be used for extensions and improvements in power plants and transmission lines. Company is under direction of General Gas & Electric Corporation, 50 Pine Street, New York.

Luzerne County Gas & Electric Co., Wilkes-Barre, Pa., plans extensions and betterments in plants and system to cost \$900,000, including installation of additional equipment.

Board of Education of South Fayette Township, Cuddy, Pa., is considering installation of manual training equipment in new two-story high school at Sturgeon, Pa., to cost \$200,000, for which bids will be asked on general contract this month. Lawrie, Green & Co., Third and Forster Streets, Harrisburg, Pa., are architects.

Delaware Electric Power Co., Wilmington, Del., an interest of United Gas Improvement Co., Philadelphia, is planning for extensions and improvements to cost \$1,600,000, including transmission line construction, power substations, etc. Thomas W. Wilson is general manager.

Pittsburgh

PITTSBURGH, March 19.

THE Westinghouse Electric & Mfg. Co. has issued its regular quarterly machine tool list, containing 30 items, with about 20 in which machine tool dealers will be interested. The Pittsburgh Plate Glass Co. is reported to have bought a few tools for its Ford City, Pa., works. Business in general is fairly active, but demand is largely for replacement and sales rarely include more than one item.

Bids will be received by Borough Council, Coraopolis, Pa., until April 2 for one triplex plunger pump, capacity 1,500,000 gal. per 24 hr. W. E. Cain, 1018 Fifth Avenue, is secretary.

Pittsburgh Plate Glass Co., Frick Building, Pittsburgh, has extended plans for expansion at its Ford City, Pa., sheet glass plant, and will expend close to \$5,000,000 over about 18 months for new buildings and equipment. A complete new operating unit will be provided. Contract for building has been let to McClintic-Marshall Co.

Allegheny Metal Products Co., 1902 Brighton Road, Pittsburgh, has taken over a two-story building at Verona, Pa., and will remodel for a machine works.

Consolidated Gas Co., Huntington, W. Va., recently formed with a capital of \$4,000,000 by W. P. Floyd and George I. Neal, Huntington, plans construction of a pipe line in Wayne and Mingo counties for natural gas supply.

Cities Service Power Co., 60 Wall Street, New York, is reported planning a steam-operated electric power house on Ohio River, opposite Moundsville, W. Va., to cost in excess of \$300,000 including transmission lines.

Lawson Mfg. Co., Lexington Avenue and Thomas Boulevard, Pittsburgh, manufacturer of heaters and heating equipment, has asked bids on general contract for a one-story addition, to cost \$50,000 with equipment. Barnard H. Prack, Martin Building, is architect.

Stetson Rubber Co., East Butler, Pa., recently formed by H. B. Callahan, general manager, Corona Cord Tire Co., with local mill, and other officials of that company, contemplates early erection of new plant on neighboring site, consisting of three one-story units, each 42 x 100 ft., to cost more than \$70,000 with equipment. New mill will be used for production of automobile tires of special type.

Board of Education, Pitcairn, Pa., contemplates installation of manual training equipment in a two-story addition to high school to cost in excess of \$160,000. W. Ward Williams, 309 Fourth Avenue, Pittsburgh, is architect.

Lewistown Overhead Door Corporation, Lewistown, Pa., is said to be planning an expansion program and contemplates doubling facilities in a number of departments.

Rolland Glass Co., Clarksburg, W. Va., manufacturer of sheet glass, has purchased plant of Lafayette Window Glass Co., Clarksburg, and will use for expansion.

City of Mannington, W. Va., is receiving bids until March 31 for construction of a concrete water tank. Plans and specifications at office of the city clerk.

The Crane Market

THERE is very little new inquiry for overhead or locomotive cranes, but there is a good volume of business still pending. In locomotive cranes, the Amtorg Trading Corporation, 165 Broadway, New York, still has nine 40-ton cranes to purchase for export to Russia and there is a 20-ton locomotive crane for the Delaware, Lackawanna & Western Railroad. In the overhead crane field there is a 25-ton, 1-motor crane for F. L. Smith & Co., New York, two 225-ton and one 50-ton cranes for the Reading Railroad and two 15-ton lumber handling cranes for the Franklin Lumber Co., Newark, N. J. No action has been taken by Thomas E. Murray, consulting engineer, New York, on the 100-ton crane for the New York Edison Co.

In the Pittsburgh district, the Wheeling Steel Corporation is inquiring for eight overhead cranes for its projected 60-in. continuous 4-high strip mill at Steubenville, Ohio.

Among recent purchases are:

E. L. Phillips & Co., 50 Church Street, New York, 40-ton, 1-motor overhead crane for Long Island Lighting Co., from Cleveland Crane & Engineering Co.

Bethlehem Steel Co., Bethlehem, Pa., five 3-ton and four 2-ton, 2-motor hoists for Wilmington, Del., from American Engineering Co.

McClintic-Marshall Co., Pittsburgh, 20-ton, 84-ft. span overhead crane with 5-ton auxiliary for Pottstown, Pa., plant, from Wisconsin builder.

Valley Mould & Iron Corporation, Pittsburgh, 5-ton, 60-ft. span overhead crane for South Chicago works from Shaw Electric Crane Co.

Danville Structural Steel Co., Danville, Pa., two 10-ton, 96-ft. span overhead cranes from Northern Engineering Works.

Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa., 5-ton, 26-ft. 6-in. span overhead crane for warehouse and service station at Utica, N. Y., from Northern Engineering Works.

W. S. McDowell Lumber Co., Chester, Pa., 10-ton crawl-tread locomotive crane from Browning Crane Co.

National Plate Glass Co., Ottawa, Ill., 13 2-ton, 3-motor electric cranes and two 20-ton, 3-motor overhead cranes from Harnischfeger Corporation.

Byllesby Engineering & Management Corporation, for delivery in Iowa, 50-ton power house crane from Harnischfeger Corporation.

St. Louis

St. Louis, March 19.

PLANS are being drawn by Polar Wave Ice & Fuel Co., 3638 Olive Street, St. Louis, for an ice-manufacturing plant to cost more than \$50,000 with equipment. H. G. Clymer, Wainwright Building, is architect.

Sphinx Electrical Mfg. Co., recently organized to take over and expand Bartholomew Battery & Supply Co., 4247 Beethoven Street, St. Louis, is considering a new plant in vicinity of Columbia, Mo., for manufacture of electric storage batteries to cost close to \$75,000 with equipment.

Ovens, power equipment, conveying and other machinery will be installed in multi-story baking, storage and distributing plant to be erected by Great Atlantic & Pacific Tea Co., 3127 South Grand Boulevard, St. Louis, in Mill Creek Valley section, to cost more than \$500,000. Headquarters are at 150 Bay Street, Jersey City, N. J.

Board of Education, Stillwater, Okla., has filed plans for a one-story manual training school, 100 x 100 ft., to cost approximately \$40,000 with equipment. Phil A. Wilbur, Architectural Department, Agricultural and Mechanical College, is architect.

Black River Hydro-Electric Co., Railway Exchange Building, St. Louis, W. A. Fuller, secretary, is said to have plans for a hydroelectric generating station on Black River, near Poplar Bluff, Mo., to cost more than \$3,000,000 with transmission lines. It is understood that project will be carried out in cooperation with Middle West Utilities Co., 72 West Adams Street, Chicago, which purposes to operate station under lease.

Missouri Portland Cement Co., Southwestern Bell Telephone Building, St. Louis, has awarded general contract to Gamble Construction Co., 620 Chestnut Street, for new cement mill in Prospect Hill section, to cost in excess of \$250,000.

Board of Education, District No. 69, Lyons, Kan., plans installation of manual training equipment in new two-story high school to cost \$250,000. Mann & Co., R. W. Building, Hutchinson, Kan., are architects.

Normandy Consolidated School District, Normandy, Mo., will take bids in April for a two-story and basement vocational school, 60 x 270 ft., to cost approximately \$115,000 with equipment. William B. Ittner, Board of Education Building, St. Louis, is architect.

Capital Garage, Inc., Kansas City, Mo., has plans for a seven-story automobile service, repair and garage building, 125 x 180 ft., to cost close to \$200,000.

City Council, Harvard, Neb., has authorized plans for a municipal electric light and power house to cost \$40,000, in which amount bonds have been approved. Grant, Fulton & Letton, 525 South Thirteenth Street, Lincoln, Neb., are architects.

Larkin Packer Co., 6200 Maple Avenue, St. Louis, manufacturer of oil well supplies and expansion boring bars and cutters, has purchased at receiver's sale entire assets of Davis Boring Tool Co., including two-story factory at 3963 Forest Park Boulevard. Two companies will be operated separately with general offices at Larkin plant. No changes will be made in products, but Larkin company will confine itself solely to oil field equipment manufacture while boring

bar, cutter and reamer production will be centered at Davis plant.

Superior Oxy-Acetylene Co., 511 Locust Street, St. Louis, has been organized to manufacture oxygen and acetylene and job Rego welding and cutting equipment. Plant has been built and all equipment purchased.

Chicago

CHICAGO, March 21.

SALES of machine tools are moderately active, but are not well distributed among the various sellers. The past week marked the closing of several sizable industrial lists. The International Harvester Co. has purchased \$140,000 worth of equipment for its Rock Island plant, and Allis-Chalmers Mfg. Co., Milwaukee, has closed for machine tools amounting to \$40,000. The Nash Motors Co. has purchased a number of replacement items and several new machines for its plants at Kenosha, Racine and Milwaukee. Prompt delivery is asked on these orders. A machinery manufacturer in Chicago has ordered a 48-in. planer.

The Santa Fe list remains the only railroad business of note before the trade. This request for prices came earlier than usual this year and the trade anticipates that some orders may be placed before the end of April. Inquiry for used machines is active but the available supply has been well picked over.

Nichol Foundry Co., 309 West Austin Avenue, Chicago, will build a foundry, 60 x 71 ft. G. E. Pearson, 400 West North Avenue, is architect.

Stocker, Rumely, Wachs Co., 117 North Jefferson Street, Chicago, dealer in machine tools, has been appointed Chicago district representative for line of shapers and lathes manufactured by Rockford Machine Tool Co., Rockford, Ill.

Theodore Geissmann & Co., Inc., 180 North Michigan Avenue, Chicago, dealer in iron and steel rolling mill products, has been appointed district sales agent in Central West for Van Huffel Tube Corporation, Warren, Ohio, manufacturer of lock-joint butted and open seam tubing.

City of Moline, Ill., will issue \$350,000 in bonds for erection of a municipal barge terminal and grain elevator.

Plans are being arranged by Miehle Printing Press & Mfg. Co., Fourteenth and Robey Streets, Chicago, for new plant units and equipment for increase in capacity. A bond issue of \$5,000,000 is being sold, portion of fund to be used for expansion.

Certain-Teed Products Corporation, 100 East Forty-second Street, New York, manufacturers of roofing products, etc., will take bids on general contract in April for one-story plant unit at Marseilles, Ill., largely for storage and distribution, to cost about \$40,000 with equipment. Klipstein & Rathman, Security Trust Building, St. Louis, are architects.

City Council, Hawarden, Iowa, will soon begin construction of addition to municipal electric light and power plant, to cost about \$40,000 including equipment. K. C. Gaynor, Norfolk, Neb., is engineer.

Iowa Railway & Light Co., Cedar Rapids, Iowa, has applied for permission to construct a hydroelectric power plant on Cedar River, near Rochester, to cost about \$2,000,000, including power dam and transmission lines. Isaac B. Smith is president.

Denver & Rio Grande Western Railway Co., Equitable Building, Denver, Colo., is planning for new car and locomotive repair shops at Salida, Colo., to cost approximately \$100,000 with equipment. It is also proposed to install several water-treating plants in Colorado and Utah at a cost of about \$200,000.

Chicago, Burlington & Quincy Railroad Co., Omaha, Neb., is said to be planning enlargements in its engine house and shops at Denver, Colo., to cost more than \$50,000 with equipment.

Mechanical Plating Co., 620 West Monroe Street, Chicago, has purchased one and two-story building at 1522-26 West Austin Avenue, 75 x 110 ft., and will remodel for a new plant.

Minneapolis, St. Paul & Sault Ste. Marie Railway Co., National Soo Line Building, Minneapolis, Minn., is considering extensions and betterments in engine house and shops at Stevens Point, Wis., to cost about \$30,000.

Northern States Power Co., 15 South Fifth Street, Minneapolis, Minn., will make extensions and improvements in steam-operated electric power plants at Fargo, Grand Forks and Minot, N. D., including installation of electrical and mechanical equipment, boiler-feed pumps, coal crushers, etc. Company is operated by Bylesby Engineering & Management Corporation, 231 South La Salle Street, Chicago.

Barber-Greene Co., Aurora, Ill., manufacturer of portable conveyors, bucket loaders and other mechanical equipment, contemplates a one-story addition to cost more than \$30,000.

Dayton Co., Seventh Street and Nicollet Avenue, Minneapolis, Minn., has asked bids on general contract for a four-story addition to automobile service repair and garage building, to cost about \$400,000 with equipment. Long & Thorshov, Andrus Building, are architects.

Consolidated Machine Tool Corporation will move its Chicago office April 1 to room 417, Machinery Hall, 547 West Washington Boulevard.

American Bosch Magneto Corporation, Springfield, Mass., has merged its Detroit and Chicago sales and service branches under general management of C. L. Shedd, automotive general sales manager at Chicago. Detroit manufacturer's sales division will maintain offices and personnel at 89-95 Hancock Avenue West, Detroit, under management of Max Tost.

Combustioneer, Inc., 570 West Randolph Street, Chicago, has been organized by men formerly interested in Iron Fireman Corporation, Chicago, to manufacture new automatic stoker designed to feed coal automatically to fire bed by underfeed principle and distribute it evenly over entire bed.

Fantus Factory Locating Service, formerly at 1313 South Oakley Avenue, Chicago, has removed to 129 North Clark Street, Chicago.

Milwaukee

MILWAUKEE, March 19.

FURTHER improvement in the call for machine tools has developed although not all shops are sharing in the betterment. Production averages well, however, and the trend is upward. Miscellaneous business still predominates, although automotive and power farm machinery industries are advancing steadily. Replacement business is relatively good and there is a moderate movement of the better class of used tools. Confidence is expressed that a substantial volume of new business is in the foreground, and that the hesitating tone of business is gradually disappearing.

Union Refrigerator Transit Co., Milwaukee, manufacturer of refrigerator cars, has increased its capitalization from \$2,000,000 to \$3,500,000. While no plant extensions are contemplated at present, considerable replacement of equipment is being done. Walter Alexander is president and general manager.

Frank Kriwanik, Denmark, Wis., has placed general contract for erection of a garage, sales and service building, 54 x 105 ft., part two stories and basement, with Jorgenson Construction Co., local.

Smalley Corporation, Manitowoc, Wis., has been incorporated with \$50,000 capital stock to take over and continue operation of Smalley Mfg. Co., farm machinery and tools. Business has been conducted for some time by a committee of creditors. W. R. Carr, Anderson, Ind., has now acquired

entire interest and becomes vice-president of new corporation. Frank J. Kerscher, Manitowoc, is president, and John G. Kelley, who has been in charge of affairs for creditors, is assistant secretary and manager.

H. Vingren, formerly connected with Nash Motors Co., Kenosha, Wis., has organized Vingren Pattern Works and is establishing a shop in Kenosha for production of wood and metal patterns, templates and allied goods.

Allen-Bradley Co., 494 Reed Street, Milwaukee, manufacturer of electric controlling devices, radio specialties and equipment, is taking bids for erection of a furnace house and substation, 44 x 140 ft., one and two stories. Work on plant additions, costing about \$350,000, is nearing completion and includes a nine-story wing, 50 x 150 ft., and a five-story addition on present three-story shop, 67 x 90 ft.

F. Rosenberg Elevator Co., Milwaukee, manufacturer of freight and passenger elevators, has established a branch office at 113 Main Street, La Crosse, Wis., in charge of Henry Schulz. A service station equipped to give service on all makes of elevators will be maintained.

South Atlantic States

BALTIMORE, March 19.

CONTRACT has been let by Virginia Barrel Co., Ostend and Leadenhall Streets, Baltimore, to Maryland Metal Building Co., local, for a one-story addition, totaling about 8500 sq. ft. floor space, for production of steel drums. Headquarters are at Winchester, Va.

Board of District Commissioners, District Building, Washington, is asking bids until March 29, for sheet steel for use in automobile license manufacturing plant at district reformatory, including 199,500 lb. No. 22 gage, and 33,320 lb. No. 20 gage; until March 26 for metal lamp posts and fittings for electrical department.

Celluloid Corporation, Anacostia, near Cumberland, Md., operated by Celanese Corporation, same location, has awarded general contract to Hughes-Foulkrod Co., Schaff Building, Philadelphia, for initial units of plant for production of cellulose acetate, to cost \$1,500,000 with machinery.

Norfolk & Western Railway Co., Roanoke, Va., Clyde Cocke, room 351, purchasing agent, is asking bids until March 28 for parts for electrical equipment, electrical apparatus and repair parts for mechanical stokers, contract serial AA-519.

Bureau of Supplies and Accounts, Navy Department, Washington, will receive bids until March 27 for welding wire and rods for Eastern and Western yards, schedule 8693; insulated wire and cable, schedule 8703; pliers and nippers, schedule 8666; steel tubing for Mare Island and Puget Sound yards, schedule 8671; four cruising turbine reduction gears and oil clutch assembly and one set of spares for Mare Island and Puget Sound yards, schedule 8672.

Georgia Portland Cement Corporation, Sandersville, Ga., has plans for a new cement mill, work to begin in 60 to 90 days. Initial plant will have output of 50,000 bbl. per month of special quick-hardening cement and will cost in excess of \$1,200,000 with machinery. H. K. Ferguson Co., Cleveland, is engineer for project, and has opened offices in Southern Finance Corporation Building, Augusta, Ga. W. H. Kewish is special engineer in charge of machinery purchases.

General Minerals Corporation, Mather Building, 516 G Street, N. W., Washington, Lyle N. Gillis, secretary, is completing plans for mining plant on about 1000 acres at Chula, Va. Installation will include steam-operated power plant, with boilers, engines and generators; hoisting equipment with maximum capacity of 6 tons; conveying equipment, etc.

Public Improvement Commission, Baltimore, has approved fund of \$700,000 for establishment of municipal airport, including construction of hangars, repair and reconditioning shops, oil storage and distributing plant, etc. A special committee, Robert Garrett, chairman, has been appointed to carry out project. Charles F. Goob is chief engineer of city.

Georgia Car & Locomotive Works, Weyman and Ridge Avenues, Atlanta, Ga., plans erection of one-story unit to replace building destroyed by fire March 9.

Standard Construction Co., 514 St. Paul Street, Baltimore, is planning purchase of portable type air compressor, capacity about 110 cu. ft. per min.

Board of Awards, office of city register, City Hall, Baltimore, has approved plans for immediate erection of one-story repair shop and equipment storage and distributing building, to cost about \$125,000 with equipment.

General purchasing officer, Panama Canal, Washington, is asking bids until April 5 for steel filing equipment, electrical fixtures, cable, wire, transformers, switches, screws, bolts, steel drums, etc., for canal zone service, Panama schedule 1865.

Cincinnati

CINCINNATI, March 19.

THERE has been no diminution in machine tool sales which continue at about the same rate that has prevailed so far this month. Orders have come mostly from scattered sources and have been well diversified, although automobile manufacturers probably have contributed the largest volume. Among pending transactions in the Detroit district is one calling for the purchase of a number of special machines at an expenditure of more than \$400,000. Analysis of sales made by local machine tool companies shows that demand centers about high production tools.

Radial drill builders have followed the lead of a Cincinnati company in raising prices. Operations in metal-working plants in this city are moderate, employment having increased slowly but steadily since the first of the year. In used machinery an order for two 144-in. planers is noted.

Contract has been let by Gruen Watch Co., Iowa and McMillan Streets, Cincinnati, to Lehigh Construction Co., Newport, Ky., for a one-story addition, including improvements in present plant, to cost about \$25,000. G. C. Burroughs, Cincinnati, is architect.

Sycamore Garage Co., 2400 Gilbert Avenue, Cincinnati, has taken out a permit for a four-story service, repair and garage building, to cost about \$250,000 with equipment.

Air Corps, Material Division, Wright Field, Dayton, Ohio, is asking bids until March 28 for one tractor and one 1-ton crane, 18-ft. lift, circular 274; until March 27 for eight vertical view finder assemblies, and March 28 for tanks.

Common Council, Henderson, Ky., is reported planning extensions and improvements in municipal electric light and power plant, including new generating equipment, to cost about \$50,000.

Stimpson Computing Scale Co., Breckenridge and Logan Streets, Louisville, has awarded general contract to J. F. Russell & Co., Louisville, for an addition to cost close to 100,000 with equipment. O. D. Mock, 221 South Fifth Street, is architect.

Memphis Power & Light Co., Memphis, Tenn., is disposing of a bond issue of \$2,275,000, a portion of proceeds to be used for extensions and improvements in power facilities and transmission lines.

King Powder Co., First National Bank Building, Cincinnati, is said to be planning erection of addition to smokeless powder mill at Ashland, Ky., to cost close to \$45,000 including wheel mills, corning mill and auxiliary equipment.

Southern United Ice Co., Memphis, Tenn., has arranged for bond issue of \$1,000,000, a portion of proceeds to be used for extensions and betterments in ice-manufacturing and cold storage plants, and for acquisition of additional properties at Meridian and Newton, Miss.

Board of Education, 216 East Ninth Street, Cincinnati, will take bids on general contract in about 60 days for a two-story automotive trade school, to cost in excess of \$80,000 with equipment. Bert L. Baldwin, Second National Bank Building, is architect.

Cleveland

CLEVELAND, March 19.

MACHINE tool sales in this territory are rather slow and confined for the most part to single machines. Manufacturers report a fair volume of widely distributed orders, also mostly for single tools. Demand from the automotive industry in Michigan and other districts continues light. The Apex Electric Mfg. Co., Cleveland, has purchased a few machines against its recent list and the Champion Spark Plug Co., Toledo, is buying some equipment. A Cleveland maker of turret lathes reports a good volume of sales this month, and orders during the week included two machines for shipment to Sweden. Rebuilt used machinery is in active demand.

Plans have been filed by Arcade Garage Co., Akron, Ohio, for a four-story service, repair and garage building, 132 x 135 ft., to cost about \$250,000 with equipment.

Dockray Brass & Iron Co., North Sixth Street, Zanesville, Ohio, will soon take bids for a one-story addition, to cost close to 40,000 with equipment. J. P. Schooley, Masonic Building, is architect.

Empire Floor & Wall Tile Co., Zanesville, Ohio, contem-

plates early rebuilding of portion of plant recently destroyed by fire, with loss close to \$80,000 including equipment.

Lima-Cadillac Co., Lima, Ohio, local representative for Cadillac automobile, has approved plans for a two-story and basement service, repair and garage building, 66 x 205 ft., to cost approximately \$100,000 with equipment.

Vulcan Last Co., Portsmouth, Ohio, manufacturer of iron shoe lasts, is said to have purchased property at Brockton, Mass., for a branch plant.

Grasselli Chemical Co., Guardian Building, Cleveland, has plans for a one-story power plant at mill, to cost approximately \$40,000 with equipment.

Simplex Aircraft Corporation, Defiance, Ohio, has been formed to manufacture Red Arrow monoplanes. Company is at present operating in a building of American Steel Package Co. and has made no plans toward construction of plant.

Austin Co., Cleveland, will erect a new and larger wood-working shop on site of steel fabricating plant at Euclid, Ohio, to replace former shop on East 152nd Street, Cleveland. Ground has been broken for a two-story and basement addition to main office at Cleveland.

Buffalo

BUFFALO, March 19.

AN expansion program is under consideration by Curtiss Aeroplane & Motor Co., Buffalo, for increased facilities for motor and airplane parts and assembling. It is proposed to increase the stock from 218,060 to 300,000 shares, no par value, a portion of proceeds to be used for development. C. M. Keys is president.

The duPont Cellophane Co., Inc., River Road, Buffalo, manufacturer of special processed papers, has plans for a one-story addition to cost more than \$200,000 with equipment. DuPont Engineering Co., duPont Building, Wilmington, Del., is engineer.

McCabe & Sheeran Machinery Corporation, 244 Larkin Street, Buffalo, purchaser of plant and equipment of Sizer Steel Co., is disposing of machinery, tools and other equipment, and will soon place factory property on the market.

AnSCO Photo Products, Inc., Charles Street, Binghamton, N. Y., manufacturer of cameras, tripods and other photographic equipment, has engaged Otto S. Schlick, 136 Liberty Street, New York, engineer, to prepare plans for an addition to cost more than \$50,000 with equipment. Company has recently formed a consolidation with Agfa Products, Inc., and Agfa Raw Film Corporation, manufacturers of kindred apparatus.

Brookway Motor Truck Corporation, Cortland, N. Y., is disposing of a preferred stock issue of \$3,000,000, a portion of fund to be used in connection with merger with Indiana Truck Co., Marion, Ind., and general plant expansion. Production at Cortland and Marion plants, as well as branch factories, will include a complete line of motor trucks from light type to 7-ton capacity. George A. Brockway is president. Martin A. O'Mara, formerly connected with White Co., Cleveland, has been made vice-president and general manager.

Board of Education, Genesee Building, Buffalo, plans installation of manual training equipment in two-story high school on Ontario Street, to cost \$1,000,000, for which bids will soon be asked on general contract. F. J. & A. Kidd, 522 Franklin Street, are architects.

Josiah Anstice Co., Inc., Rochester, N. Y., has let general contract to Alexander, Shumway & Utz, for an addition to its foundry, to be completed in about six weeks.

Otis-Sawyer Boiler & Foundry Co., Oswego, N. Y., has separated its boiler and foundry departments under names of the Sawyer Brass & Iron Foundry Co. and Otis Boiler Co., Inc. Former company will continue to operate foundry, while boiler department, which was destroyed by fire about two months ago, will be rebuilt and operated by Otis company.

Indiana

INDIANAPOLIS, March 19.

BIDES have been asked on general contract by Truck Engineering Co., Fort Wayne, manufacturer of motor truck bodies, etc., for a one-story addition to cost close to \$75,000 with equipment. Guy Kahurin, Standard Building, is architect. Headquarters are at 1801 East Thirty-seventh Street, Cleveland.

In connection with expansion and improvement program to cost \$2,500,000, Indiana General Service Co., Muncie, will expend about \$250,000 for a new local substation and switching plant.

United Brick Co., Brazil, recently formed by J. E. Hendrix, Veedersburg, and associates, has acquired local property of Chicago Sewer Pipe Co., and will build new works for daily production of 150,000 face brick. A boiler plant and

machine shop will be provided. Entire project will cost upward of \$85,000.

Board of Education, Brazil, has authorized installation of manual training equipment in two-story addition to junior high school to cost \$120,000. McGuire & Shook, 941 North Meridian Street, Indianapolis, are architects.

Graham-Paige Co., West Warren Street, Detroit, manufacturer of automobiles, has formed Motor Bodies, Inc., a subsidiary, to operate such division of the business. Work is in progress on improvements in former plant of Karges Wagon Co., Evansville, recently taken over, with main unit, 100 x 400 ft., and production will soon begin on bodies for 110½-in. wheel-base cars. Later this plant will be extended for manufacture of custom bodies for larger cars.

Marvel Carburetor Co., Flint, has arranged for purchase of controlling interest in Wheeler-Schebler Carburetor Co., Indianapolis, for about \$1,000,000, and will consolidate with its organization. It is proposed to continue both plants in operation and carry out an expansion program.

Board of Education, Crisman, plans installation of manual training equipment in new two-story high school to cost \$110,000, for which plans will be drawn by W. M. Ellwood, Christman Building, South Bend, Architect.

Hammond Bolt & Nut Co., Hammond, has purchased bolt, nut and rivet department formerly owned by Illinois Car & Mfg. Co. and will operate it under practically same management.

Canada

TORONTO, March 19.

THE volume of business placed for machinery and tools the past week or two indicates that industrial, mining and other fields still have considerable needs to be taken care of. Lists are not numerous, but orders for single tools total large. Demand for replacement is active and much buying is being done on this account.

Reid & Brown, Toronto, have purchased property on Fleet Street, 64 x 670 ft., for erection of a new steel fabricating plant. Work on foundations will start at once. Building will be 300 ft. long and cost approximately \$200,000. An electric traveling crane will be installed.

S. Shupe, city engineer, Kitchener, Ont., is preparing plans for a 3,000,000-gal. activated sludge sewage disposal plant for the city. Construction work will start in spring.

I. T. S. Rubber Co. of Canada, Ltd., 28 Alpine Avenue, Toronto, is receiving bids for erection of an addition, three stories and basement, 80 x 150 ft. B. Clayton, care of company, is engineer.

Burroughs Wellcome & Co., 410 St. Nicholas Street, Ville Lasalle, Que., plans erection of a factory to cost \$75,000.

Crown Cork & Seal Co., Ltd., 87 Parliament Street, Toronto, has let contract to Wells & Gray, Ltd., Confederation Life Building, for erection of a factory to cost \$100,000. It will be one story, 120 x 200 ft., steel and brick.

Galetta Electric Co., Arnprior, Ont., plans installation of an electric generator, 400 kva. waterwheel and governor in its plant at Galetta, Ont.

Gatineau Power Co., 91 Cartier Street, Ottawa, Ont., contemplates construction of a power plant on North River at St. Jerome, Que., and another at Chute-A-Pateau on North River near St. Adele d'Abercombe, Que.

British Columbia Electric Power & Light Co., Victoria, B. C., plans the erection of a substation at Government and Bay Streets, to cost \$250,000.

Detroit

DETROIT, March 19.

PLANs are being considered by Consumers Power Co., Jackson, Mich., for a new power house in vicinity of Morley, Mich., to cost close to \$10,000,000, including transmission lines.

Detroit Show Case Co., 1654 West Fort Street, Detroit, has plans for a two-story addition to cost more than \$60,000 with equipment. B. C. Wetzel & Co., Dime Bank Building, are architects.

Pines Winterfront Co., 2636 Indiana Avenue, Chicago, manufacturer of automatic radiator shutter fronts for automobiles, has purchased controlling interest in Detroit Motor Appliance Co., Stephenson Building, Detroit, manufacturer of kindred products, and will consolidate with its organization.

Chrysler Motor Car Co., Detroit, has awarded general contract to A. W. Kutsche, 2111 Woodward Avenue, for a one-story addition, 80 x 150 ft., to cost close to \$100,000. Smith, Hinchman & Grylls, Marquette Building, are architects and engineers.

Manufacturers' Steel Supply Co., 2162 Clay Avenue, Detroit, is said to be planning installation of power press and other equipment.

Chevrolet Motor Car Co., Detroit, has awarded general contract to Everett Winters Co., 1651 East Grand Boulevard, for a one-story addition, 80 x 400 ft., to be equipped as a forge shop, to cost close to \$100,000. Albert Kahn, Inc., Marquette Building, is architect and engineer.

Liberman & Gittlen Metal Co., 322 Front Street, S. W., Grand Rapids, Mich., will soon take bids on general contract for a one-story addition, to be used largely for storage and distribution, to cost \$40,000 with equipment. D. R. McEachron, Association of Commerce Building, is architect and engineer.

Wolverine Mill & Lumber Co., 8931 Greeley Avenue, Detroit, is completing plans for a one-story and basement addition to cost about \$70,000 with woodworking machinery and auxiliary equipment. Maurice H. Finkel, Book Building, is architect.

Kewaunee Mfg. Co., South Center Street, Adrian, Mich., manufacturer of enameled iron laboratory furniture and equipment, will ask bids in April for a two-story addition to cost close to \$40,000 with equipment. Headquarters are at Kewaunee, Wis.

Detroit Chain & Service Co., Detroit, has been formed to manufacture roller chain and sprockets. Manufacturing operations have not yet begun, but company is acting as agent for American High Speed Chain Co., Indianapolis.

Losinger Aircraft & Propeller Corporation, 5257 Brooklyn Avenue, Detroit, has been organized to manufacture airplanes with special type of changeable pitch propeller. Company is leasing shop and will be in market for material and equipment.

Pacific Coast

SAN FRANCISCO, March 14.

PLANs have been filed by Laher Auto Spring Co., Twenty-sixth and Magnolia Streets, Oakland, Cal., for one-story addition, to cost about 20,000 with equipment; general contract let to Austin Co.

Southern Sierras Power Co., Riverside, Cal., has authorized plans for construction of steel tower transmission line from San Bernardino to plant of Los Angeles Gas & Electric Co., at Seal Beach, 58 miles, to cost \$750,000.

Ovens, power equipment, conveying and other machinery will be installed in one-story plant to be built by Union Maid Bakery, Los Angeles, to cost about \$85,000. L. A. Parker, Architect's Building, is architect.

In connection with an expansion and improvement program now in progress, Hawley Pulp & Paper Co., Oregon City, Ore., plans construction of new central steam power plant with high-pressure boilers and other equipment; also new pulp mill equipment for electrification of this division, replacing present water-power service. Entire project is estimated to cost \$2,000,000.

Pacific Power & Light Co., Portland Gas & Coke Co., and Northwestern Electric Co., Portland, affiliated organizations, are arranging an expansion and improvement program to cost \$2,250,000, including additions to power plants, transmission lines and power substations.

Willapa Pulp & Paper Mills, Inc., South Bend, Wash., has awarded general contract to Puget Sound Bridge & Dredging Co., Central Building, Seattle, for new one-story pulp mill, to cost about \$600,000 with equipment.

Webber Machine Works, Columbia Street, Vancouver, Wash., has filed plans for one-story machine shop addition, 50 x 80 ft., to cost about \$20,000 with equipment.

Utah Power & Light Co., Salt Lake City, has arranged for bond issue of \$5,500,000, a portion of proceeds to be used for extensions and improvements in power facilities and transmission system.

Southern Counties Gas Co., Los Angeles, has plans for a two-story equipment storage and repair shop addition at Venice, Cal., to cost about \$45,000 with equipment. Francis D. Rutherford, Mills-Fraser Building, Santa Monica, Cal., is architect.

Harry S. Scott, president Mission Rock Co., San Francisco, is at head of project to construct and operate a cold storage and refrigerating plant in Mission Rock district, to cost more than \$150,000 with equipment.

Olympic Motorboat Corporation, Seattle, has plans for expansion to double present capacity, to cost more than \$75,000 with equipment. Company has recently concluded negotiations for acquisition of Gordon Boat Co., New York, and will consolidate with organization. It will operate in future as Gordon Olympic Motorboat Corporation.

Earle M. Jorgensen Co., Los Angeles, distributor of alloy and tool steels, has established branch office and warehouse at 568 Third Street, San Francisco.

Foreign

PLANS have been approved by Demerara Electric Co., Ltd., Georgetown, British Guiana, for a new steam-operated electric power plant, with turbo-generator unit of 3750 kw. capacity and auxiliary equipment, scheduled for completion in September. Extensions will be made also in transmission lines. Company has recently secured a 50-year franchise.

A fund of close to \$60,000,000 has been arranged for new plant construction at Leningrad, Russia, under Government direction, including works for production of tractors and parts, for manufacture of typewriters; woodworking mill; plant for production of abrasive products, and artificial silk mill. American-Russian Chamber of Commerce, 50 Broad Street, New York, has information regarding projects.

United Steel Works of Germany, Hamborn, Germany, has an expansion and improvement program in progress scheduled for completion this year.

Plans are being completed for new car repair shops in conjunction with car depot, warehouse and distributing plant at Cardiff, England, for a transportation company, to cost about \$600,000 with equipment; also for an automobile repair, service and garage building at London. Information at Bureau of Foreign and Domestic Commerce, Washington, reference England No. 63200; also, at American Consulate, London, William L. Cooper, commercial attaché.

Standard Oil Co. of New Jersey, 26 Broadway, New York, has concluded arrangements for purchase of controlling interest in Creole Syndicate, operating oil properties in Venezuela, and will consolidate with its interests in that district. Creole Syndicate will take over oil lands, refineries, pipe lines and other properties of parent company and its subsidiaries, including Standard Oil Co. of Venezuela and American-British Oil Co., and will carry out an expansion program. It will be operated under direction of purchasing company.

Swiss Federal Railways, Berne, Switzerland, has begun

work on initial unit of new cold storage and refrigerating plant at Geneva, with total capacity of 229,544 cu. ft. It is purposed to construct additional units in the future. American Consulate, Geneva, Gilson G. Blake, Jr., Geneva, consul.

Plans are being arranged by Government of Burma, Rangoon, Burma, India, for a hydroelectric power development on Law Klo River, a tributary of Yonzalin River, with initial capacity of 13,500 kw., to be increased by a second unit to develop a gross output of 27,000 kw. A transmission line 130 miles long will be built to Rangoon and vicinity. Entire project is estimated to cost in excess of \$25,000,000. American Consulate, Bombay, India, C. B. Spofford, Jr., trade commissioner, has information on enterprise.

Foundation Co., 120 Liberty Street, New York, has secured contract from Government of Greece, Athens, for construction of proposed Strouma-Phillipon drainage works in Thessaly, Greece, including power and mechanical equipment, to cost about \$40,000,000. Project will be financed by American banking interests, headed by Blair & Co., 24 Broad Street, New York.

Plans are under way by a company at Johannesburg, South Africa, for a new electric generating plant, to cost close to \$1,500,000 with transmission lines. Information at office of Bureau of Foreign and Domestic Commerce, Washington, reference Africa No. 63420; also at American Consulate, Johannesburg, William L. Kilcoin, assistant trade commissioner.

Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa., has secured controlling interest in Norwegian Industrial Mfg. Co., Christiania, Norway, manufacturer of electric equipment, and will expand production to include machinery of Westinghouse type. Other expansion will also be carried out by purchasing company in different European countries, as well as in South America; for production and distribution of electrical machinery in Chile, a subsidiary, Compania Electrica Westinghouse de Chile, recently has been formed, with headquarters at Valparaiso.

NEW TRADE PUBLICATIONS

Metal Truck.—Lyon Iron Works, Greene, N. Y. Bulletin 101 of four pages illustrates and describes a utility truck for warehouse and factory use, made of metal, with low height, on the tilting principle, and with rollers to aid in loading and unloading. Its capacity is 500 lb. or more.

Blast Heaters.—Aerofin Corporation, 750 Frelinghuysen Avenue, Newark, N. J. Folder of six pages devoted to low-pressure and high-pressure blast heaters for factory and other building requirements.

Motors, Generators and Motor-Generators.—Engberg's Electric & Mechanical Works, St. Joseph, Mo. Bulletin 6023 of eight pages is devoted to direct-current motors, with ball bearings, and designed for constant or adjustable speed. Bulletin 6025 of four pages is devoted to motor-generators. Bulletin 6022 of eight pages is devoted to direct-current generators up to 45 kw. All three bulletins are well illustrated and carry clearance diagrams and tables.

Winches and Capstans.—Silent Hoist Winch & Crane Co., 772 Henry Street, Brooklyn. Bulletin 27 of four pages illustrates a series of winches and capstans used in a variety of industrial and other service.

Metal Stampings.—Crosby Co., Buffalo. Pamphlet of 24 pages illustrating a large variety of products made by stamping from steel and other metals, running up to as much as $\frac{3}{4}$ -in. thickness. These have gone into a wide variety of machinery and other equipment. They include both cold and hot-rolled open-hearth steel, high-carbon and other special steels, duralumin, aluminum, brass, copper and zinc.

Polyphase Induction Motors.—Allis-Chalmers Mfg. Co., Milwaukee. Bulletin 1118-E of 16 pages illustrates and describes induction motors of the polyphase type, together with control apparatus.

Gear Grinding Chucks.—City Machine & Tool Works, Dayton, Ohio. Bulletin BC-I, eight pages, devoted to features of the Bollender chuck for holding gears while grinding the bore. Typical jobs are illustrated.

Vertical Milling Attachments.—Porter-Cable Machine Co., Syracuse, N. Y. Booklet of 24 pages outlining the features and illustrating the company's universal milling attachments, which permit the cutter to operate at any angle and in any plane, thereby extending the range of the milling machine on which they are used. The attachments are available in various sizes for use on any standard hand or power feed milling machine, and radius, angle, form and tee slotting cutters, as well as end mills, may be employed.

Electric Meters.—Sangamo Electric Co., Springfield, Ill. Supplement to Bulletin 67, of 8 pages, illustrated, describing type HC meter.

Steel Reels and Spools.—Mossberg Pressed Steel Corporation, Attleboro, Mass. Forty-page catalog showing a special line of reels made of steel stampings (with joints either crimped, bolted, brazed or welded), suitable for such purposes as handling, annealing, impregnating or shipping wires of all dimensions and shapes.

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